

JAMAICA.

ANNUAL REPORT

OF THE

DEPARTMENT OF SCIENCE AND
AGRICULTURE

FOR

THE YEAR ENDED 31ST DECEMBER, 1924.

Ordered by His Excellency the Governor to be Printed.



DEPARTMENT OF SCIENCE AND AGRICULTURE.

REPORT FOR THE YEAR ENDED 31ST DECEMBER, 1924.

Department of Science and Agriculture,
Hope, Kingston,
29th April, 1925.

Sir,

I have the honour to submit for the information of His Excellency the Governor, the report of the Department of Science and Agriculture for the year 1924.

I.—GENERAL OBSERVATIONS.

The drought of the previous two years extended into the Summer of 1924 with disastrous results to many agricultural enterprises. Fortunately during the last half of the year plentiful rains fell, placing all branches of agriculture in a favourable position for 1925. Expressed as a rainfall average for the whole island this may be stated as follows:—

For the first half of the year only 19.56 inches of rain fell as against an average for 50 years of 31.91 inches; for the whole year, however, the average rainfall for the island was 79.28 inches or nearly 3 inches in excess of the 50-year average of 76.46 inches.

Industrially, the year was a poor one for Jamaica. Our chief staple, the banana, suffered from unfavourable seasons and bad markets. This may be summed up by the records of the banana crop of 1924, which were slightly under 12 million stems in number, and £1,225,000 in value or a reduction of 483,000 stems and of £1,040,000 in value as compared with the previous year. The effect of a loss of 25 per cent. in the value of our Exports has naturally reacted on trade and finally on public revenues. The slow but generalised paralysis resulting from a three years drought is even more deadly to the agricultural success of the colony than the swift destruction wrought by a passing cyclone.

The law of averages, however, appears to be reasserting itself and there is now a widespread feeling of encouragement and hope among the planters in all sections of the Island.

The brisk competition that enabled Jamaica to sell its drought-stricken fruit in 1923, at very good prices collapsed with the competition of large crops from Central America in 1924, prices fell, competition dwindled and a severe blow was dealt to the industry. For the coming year the prospects of the Banana Crop are excellent, but better prices are required to place the trade of Jamaica on a favourable basis.

The Panama Disease of Bananas increased during the year, the total number of diseased plants recorded being 6,698 as against 4,007 for 1923. About 75 per cent. of the incidence of this disease was in the parish of Portland. The disease occurred in districts previously infected and is gradually increasing in these districts despite the strict control which is exercised under the Order. Certain areas in Portland where the Gros Michel Banana has been grown continuously for the past 40 years are now clearly doomed and some other variety which is resistant to the Disease will have to be planted on these lands. At present there are two varieties of bananas in Jamaica which are known to be resistant to disease, viz., the China (*Musa Cavendishii*) and the "Robusta" recently introduced from Central America.

Commercially both these varieties have disadvantages. The "China" only grows well on good land. The bunches are liable to be loose. The tips of the fingers are subject to rotting. The carrying power of the fruit is inferior to that of the Gros Michel. As this banana is the standard variety of the Canaries it is probable that it could be cultivated and shipped from Jamaica. In the Eastern United States the "China" Banana is not liked. On the Pacific coast, however, this is practically the only banana available. The "China" makes excellent figs and is greatly liked by the peasantry in Jamaica for cooking in the green state. Under present conditions the people refuse to cultivate the China Banana extensively even in districts where disease is troublesome.

The new banana which has been called "Robusta" is apparently closely similar to the so-called "Congo" grown in Costa Rica, which was found a commercial failure in that country some years ago. The suggestion that the "Robusta" was the same banana as the "Giant Fig" of Grenada has been found to be incorrect.

This banana grows well and grades about 25 per cent. better than the Gros Michel. It fruits two or three months earlier. It is shorter and less exposed to wind than the Jamaica Banana, but the heavy bunches frequently require "crotching." The fruit of the Robusta Banana ripens so as to be practically identical in texture and flavour with the ordinary banana of commerce. It is, however, less strongly furnished as to stem and the skin is more liable to bruising. It ripens best if kept cool and cold storage ships would be desirable for its transport.

The Robusta is being accepted as ordinary fruit at Buying Stations in Hanover, St. Mary and St. Thomas where it is being grown by small cultivators.

The problem of a banana resistant to Panama Disease is a vital one for the banana industry of the world, for it is clear that the areas capable of growing the Gros Michel will be steadily reduced by the spread of the disease.

Jamaica has hitherto enjoyed a preferential position owing to the effective control exercised over Panama Disease but it is now apparent that large areas in the parish of Portland are rapidly giving way to disease and that the substitution of a disease-resistant banana is now an important question for that section of our banana-growing lands.

At the Experiment Station a collection of all the varieties of bananas, plantains and wild seeding species of banana obtainable are being grown and daily operations are being carried out in cross-fertilisation. The first result so far recorded from these experiments has been to confirm a former finding that *Musa Cavendishii* (Canary or China Banana) is quite sterile and cannot produce seeds even when fertilised with pollen from wild seeding species.

Recent observations have shown that the fusarium causing Panama Disease remains in the soil over long periods of years, and it must now be accepted that there is no hope of getting rid of infection by prolonged fallowing of infected land.

Experiments with a variety of chemicals calculated to sterilise the soil have all lead to failure. Corrosive Sublimate used in enormous quantities and at prohibitive cost has alone been found effective in destroying the infection of Panama Disease in diseased soil. Attempts to select a disease-resistant strain of the Gros Michel have not been encouraging and "a new banana" is clearly required to provide a solution of this problem.

For the coming year the output of bananas is expected to show a marked increase with a better grading of the stems due to more favourable seasons. The parish of Portland, where disease conditions are the most serious, is expected to produce a record crop owing to the enterprise of the planters in extending their areas in bananas.

It has been suggested that the banana planters of Jamaica are unprogressive in not resorting to the use of fertilisers for improving the grade of their fruit.

It has, however, been demonstrated by the experiments of the Department during the past 20 years and confirmed by the experience of large planters that there are no fertilisers known which will convert, say, a seven hand stem of bananas into a standard "bunch" of nine hands. Fertilisers can increase the size of the plant and of its leaves but the control of the "bunch" is dominated by the tilth and condition of the soil.

Thus "good cultivation" as expressed by forking, draining, mulching, giving green dressings and, in some cases, liming is the factor which controls the grading of a field of bananas.

The application of fertilisers will not result in those conditions of soil tilth and an adequate supply of humus which are so essential for the well-being of the banana plant with its soft root-system.

With the advent of normal rains the banana planters of Jamaica will be able with their efficient methods of cultivation to restore the standard of fruit produced in the Island. They are advised that fertilisers will not pay them and that "good cultivation" is the secret of success.

The Sugar Crop suffered greatly from the drought, the Exports for 1924 being slightly under 23,000 tons valued at about half a million pounds sterling as against 26,000 tons valued at £675,000 in the previous year. Rum, however, became again merchantable at good prices and a decided increase in quantity (nearly 200,000 gallons) and in value (£70,000) was recorded for the rum exported in 1924, as against that for the previous year.

The continuation of the State Aid to the estates was effective in tiding over this difficult year for the sugar planters who are now faced with severe competition in the sugar markets of the world from the recent increase in sugar production. It is, however, an advantage to have recovered the favourable trade for Jamaica rums both of the "Home Trade" and "high-flavoured" qualities.

The campaign against Mosaic Disease was continued by the Superintendent of Agriculture with a staff of three Inspectors.

Lower Trelawny has made a splendid showing and there are many estates now where Mosaic Disease has been reduced to sporadic cases. The position in Westmoreland became quite serious after the May rains but subsequently a great improvement took place and where the planters have followed up the work of "roguing" the disease, is now under control. The "Uba" cane has proved of great service and has enabled several estates to place their cultivations on a much improved basis. The results from the factories have shown that the "Uba" offers no serious difficulties in manufacture.

The Department established a record by the distribution of 937,489 cane tops and cuttings to the public or more than twice the number for the previous year.

The outstanding new varieties of Sugar Cane are firstly "Uba" and secondly the Barbados Seedling BH (10) 12.

The two canes resistant to Mosaic Disease which were sent us by Dr. Lyon of Honolulu-Mexican Striped and Badila—were propagated for trial on estates. Three half-bred "Uba" seedlings at Hope were selected for final trial before being sent to estates. Some new canes resistant to Mosaic Disease are being obtained through the assistance of the Director of Kew.

Great care is necessary in introducing canes from abroad owing to the dangers of various insidious diseases which have done great damage to the sugar canes in other parts of the world.

The exports of coconuts and copra indicated a reduction of 6,400,000 nuts over the production of the previous year. Owing to more favourable prices for both coconuts and copra the value of coconut products in 1924 was almost the same as in 1923, viz., £176,000 as against £178,000 in round numbers. There was no serious trouble with coconut diseases during the year. A so-called "new disease" reported by the Supervisor of Instructors for the Agricultural Society was found on examination by the Microbiologist to be due to lightning, while certain unthrifty palms in Trelawny were found to be suffering from the continued disadvantages of bad soil and drought.

It may be accepted as a fact that there is very little serious coconut disease on the commercial plantings of coconuts in Jamaica at the present time.

The drought affected the coffee crop and reduced it from 3,800 tons to 2,600 tons. Prices were, however, very good and the value for 1924 was £225,000 as against £242,000 in 1923. The planting of coffee is being extended by small growers as a result of recent encouragement. It would be quite easy for the output of coffee from Jamaica to be doubled so as to raise it from 8 million to 16 million pounds weight per annum if the smaller cultivators find encouragement to grow this crop. The buying of coffee by Central Factories has greatly encouraged the coffee industry in the Blue Mountains where the cultivation on the old plantations has been gradually going out.

Cacao has done rather better, the output was 59,000 hundredweights as against 43,000 in the previous year while the value rose from £60,000 (a very low record) to £82,000.

At present cacao offers small encouragement to the growers and planting has almost entirely ceased. The "Ariba" Cacao at Castleton, grown from seeds from the Ariba district of Ecuador, was cured at Hope and tested in England through the assistance of the Director of Kew. It was found to be good Jamaica cacao but not possessed of the valuable "spice" flavour of the original Ariba Cacao. Just as with Blue Mountain Coffee a change of site results in a loss of character of flavour, so it would appear that the flavour of Ariba Cacao is dependent on the climate and soil of the up-river cacao areas of Ecuador and is not a fixed character of the variety.

Logwood has remained steady at a moderate standard of price and production, the total value of Logwood products being £274,000 as against £271,000 in 1923. This has been a useful assistance as a side-issue of many forms of agriculture and it is very satisfactory that this trade has emerged securely from the after-math of war and the competition of synthetic dyes.

Pimento with a reduced production of about 13 per cent. earned an increased price of about one-third over that realised for the previous crop, thereby confirming past experience that reduced crops of pimento by relieving over-production of this spice lead to a better market.

Pimento Leaf Oil is being manufactured on a small commercial scale in Manchester and St. Ann. Enquiries from owners of pimento lands have been received and advice given as to a suitable plant for distilling oil. The price of Pimento Leaf Oil is still rather low, but it appears to show a margin for profit to encourage production in Jamaica.

Hides have doubled in value as compared with 1923. The embargo of the United States due to the Foot and Mouth epidemic has now been raised and it has been again possible to send hides and leather from Jamaica to America.

Goat skins, particularly those of good quality are in strong demand. An excellent goat skin leather is being produced in a local tannery.

The Tobacco trade has remained in a rather depressed condition. The exports were less than in 1923. Cigarette Tobacco produced from Virginian seed has been produced in St. Andrew and the local cigarette trade appears to be calling for this type of leaf.

Ginger, owing to unfavourable seasons, showed a reduction in quantity and of nearly £20,000 in value. The demand, particularly for "No. 1 Ginger," is good and the small growers of ginger have been encouraged to greater efforts in its production by one of the leading consumers of Jamaica Ginger in the United States and Canada.

Annatto showed a reduction of about 15 per cent. in quantity due to drought conditions.

The price, however, was so good that this product brought nearly £28,000 as against £11,400 in the previous year.

The demand for *Annatto* is strong at the present time and it would appear that the output of *Annatto* could be doubled to advantage. Small settlers are advised to extend their patches of *Annatto* with the expectation of getting good prices in the future.

Citrus Fruits.—Exports of Grape Fruit increased by 25 per cent. as compared with 1923, Oranges, however, fell by nearly 20 per cent. This industry is at present in a most unsatisfactory condition. Reliable markets and fair profits have yet to be found for our citrus fruits.

The Orange Oil business suffered from unfavourable seasons by a reduction of more than one-third in value and nearly one-half in quantity as compared with the previous year. The distillation of rinded oranges so as to recover another 25 per cent. of oil as "distilled oil" is now being organised by some producers.

Honey has benefited by better prices and a slightly smaller crop than that of 1923 fetched nearly £26,000. No serious diseases of bees have been experienced during the year. The Department continues to exercise control in effecting a safe system of importation of Queen Bees. The postal conditions from U.S.A. during the year were unfavourable to bees and many Queens sent by post arrived dead.

Tick Destruction.—During the year 22 new Dipping Tanks were registered bringing the total number of Dipping Tanks for the Island to 249.

To supply these tanks the Government Laboratory supplied 13 tons of Paranaph and 7½ tons of Arsenite of Soda during the year.

The Estates were also kept provided with Standard Iodine and Chemicals for testing the dip. The recent drop in the price of Arsenic should enable the Department to sell Arsenite of Soda at a cheaper price when new stocks are ordered.

The Tick Campaign now requires some organisation to make it efficient. Inspection of dipping tanks is necessary if effective results are to be obtained. It is hoped during the coming year to secure some progress in this direction.

The equipment of "Grove Place" has progressed during the year. A Concrete Silo of 230 tons capacity, a Dairy Building with stanchions for 50 cows, a machine shop with a 20 H.P. Blackstone Oil Engine and a corn mill, saw-mill and silo-filling equipment have been installed. A windmill has been erected to pump water from the well near the Railway Line and this is arranged so as to supply the bull pens and various tanks with water.

A long cattle trough fed from the large pond has been constructed and the pond itself has been fenced round so as to prevent fouling of the water by the stock.

Nearly 200 tons of silage were made from Maize, Guinea Corn and Guinea Grass fodder. Elephant Grass is being extended and is a promising fodder material.

The English thoroughbred stallion "Water Jacket" was destroyed having served in Jamaica for 14 seasons and with over 500 foals to his credit. The imported stock remained in good condition and all the bulls were in good serviceable condition.

The deficit of nearly £900 on the operating account in its first year of operation (1921-1922), has been repaid and "Grove Place" has at last begun to earn a contribution to General Revenue from its "Working Account."

The Hope Farm had a trying time for the first seven months of the year due to lack of rain. A good crop of Guinea Corn was eventually obtained and all four silos have been filled. The new field of 11 acres of Uba Cane has proved of great service and is now yielding a crop of over 700 tons for use as fodder for the cows. The average daily yield of milk in 1924 was 308 quarts as against 314 in the previous year. At the time of writing, however, the yield has risen to 480 quarts per diem due to more favourable seasons and the improvement in the dairy herd which has been effected by the drastic drafting of all cows below a profitable standard of production, and their replacement by heifers bred for higher milk capacity.

A record of production, believed to be unequalled in the West Indies, was effected by the native heifer "Norbrook II," which gave 12,305 lbs. of milk and 455 lbs. of butter fat in 365 days.

This animal was bred at Hope and is a composite blend of Zebu, Ayrshire and Holstein blood.

This record was made in the open pasture on 2 milkings a day, and indicates that in the Tropics it is possible to rival the milk yield of cows in temperate climates if the right blend of Indian and Northern blood be resorted to.

The Tuberculin Tests at both Farms were without a positive reaction.

The annual valuation of Livestock at Hope and Grove Place was made by E. W. Muirhead, Esqr., at the end of December. Although the quality of the stock had improved, reduced values for cattle caused a reduction in the valuation at each Farm.

Full financial statements are appended to this Report.

The Lititz Fibre Factory did not operate during the year. Expenses were reduced to a modest sum and it is now considered that the fields have grown so as to enable the factory to work at a moderate profit during the present year. The Sisal industry is beginning to revive from the early troubles of the pioneers. The portable machine invented by Mr. Anderson of May Pen is proving to be successful, and will revolutionise the industry by enabling fibre to be manufactured from moderate areas of sisal.

The Rope Factory is reported to be unable to supply the local demand for its product. The price of fibre has been good during the year and the industry appears to be a promising one for development on large areas in Jamaica where other crops can not be grown.

Contagious Diseases of Animals.—No cases of Foot and Mouth Disease or of Anthrax were recorded during the year. The quarantine against the Foot and Mouth Disease Epidemic in the western parishes which broke out in July, 1922, was finally removed on September 4, 1924.

In closing these observations on the year's work I desire to express my indebtedness for the valuable help I have received from the Advisory Committee on the Banana Industry and from the Boards of Management for Grove Place and Lititz whose members have at personal sacrifice placed their experience and knowledge at my disposal and assisted me effectively in the work of administration.

II.—PUBLIC GARDENS.

REPORT OF THE SUPERINTENDENT.

1. HOPE GARDENS.

The drought which was experienced during 1923 continued to the end of July this year and a rainfall of only 14.21 inches was recorded for the period, January to July, 1924.

All the Greenhouses were repaired and painted and general repairs carried out to the garden shelters, benches and pergolas.

The work of re-planting the old worn-out rose beds was continued. Several beds were thoroughly trenched, manured, and planted with young plants of the Maman Cochet rose. Six of the beds at the western end of the Rose Garden were made into a lawn owing to the damage done by the roots of the trees in the border nearby.

The two long borders to the north and south of the lawns were regularly attended to and the various ornamental and flowering shrubs made a beautiful display in their respective seasons. The succulent border to the west of the gardens which was thoroughly overhauled last year and replanted with varieties of Cacti and other allied plants, is now well established. The succulent border along the entrance of the central drive has also been attended to.

A border, 150 ft. long, has been established at the end of the Water Garden and next to the old Coffee plot. This has made a decided improvement to that part of the Gardens.

The half-circular bed situated to the north of the Office, and which was cleared of the old trees of Oleander, has been filled up with three plants of the Bougainvillea "Rosa Catalina" and six plants of a seedling which was raised in the Gardens by crossing the "Rosa Catalina" with the "Brick-red." The flowers of this seedling closely resemble those of the Rosa Catalina. The Cannas that were planted in this bed last year made a pleasing effect.

Every year an attempt is made to cross the different varieties of Bougainvillea with the hope of obtaining new varieties.

The Nursery work requires and receives special attention at all times. Our aim is to keep in stock a large and varied assortment of plants, a large number of which are distributed free to schools, hospitals, and other Government Institutions.

The distribution of economic trees to settlers in the Port Royal Mountains for purposes of afforestation was again carried out by Mr. A. P. Hanson, Agricultural Instructor for St. Andrew.

The following is a list of plants distributed by Mr. Hanson during the year under review:—

West Indian Cedar	..	..	1,050
Mahogany (Native)	..	..	850
Mahogany (British Honduras)	..	..	250
Breadnut	..	..	50
Sweet Orange	..	..	400
Grapefruit	..	..	1,150
Tangerine	..	..	200
Papaw	..	..	86
Chirimoya	..	..	12
Cassia siamea	..	..	200

4,248

PLANTS DISTRIBUTED FROM HOPE GARDENS, 1924.

Sold.

Economic Plants—

Cacao	..	..	181
Citrus	..	..	1,725
Nutmeg	..	..	425
Eucalyptus	..	..	141
Misc. Fruit and Economic Plants..	..	..	2,640

5,112

Ornamental Plants

24,863

29,975

Free Grants.

Economic Plants—

Cacao	..	..	12
Citrus	..	..	1,771
Nutmeg	..	..	6
Eucalyptus	..	..	42
Cane Tops and Cuttings	..	..	421,385
Misc. Fruit and Economic Plants..	..	..	7,299

430,515

Ornamental Plants

5,208

435,723

Total number of Economic Plants

435,627

Total number of Ornamental Plants

30,071

Total number of Plants distributed

465,698

The following statement shows the distribution of plants for the last three years from the Nursery at Hope:—

	1924.	1923.	1922.
Cacao	193	220	868
Citrus	3,496	4,009	4,460
Nutmeg	431	878	651
Eucalyptus	183	333	291
Cane Tops and Cuttings	421,385	225,116	426,449
Misc. Fruit and Economic Plants including			
Timber Trees	9,939	16,730	10,377
Ornamental Plants	30,071	28,723	24,366
	465,698	276,009	467,462

2. CASTLETON GARDENS.

During the latter part of the year under review heavy rains were experienced which did an immense amount of damage to the walks.

A pathway which was greatly needed in the lower section of the Gardens has been made, starting from the main road which passes through the Gardens, along the river bank and connecting with the one at the Bamboo Walk which is a favourite spot where parties generally take their refreshments.

The fences on both sides of the main road which were in bad condition have been repaired. It is extremely difficult to obtain fence posts in this district and two hundred posts had to be purchased in Kingston and carted to Castleton.

Iron gates have been fixed to two entrances to the Gardens and all the gates have been repaired and painted.

One of the most important branches of the work at Castleton is the propagation of ornamental and economic plants which are sent to Hope Gardens for distribution. The climatic conditions at Castleton being more suitable for the propagation of plants a large assortment of material is sent from Hope to be propagated at Castleton.

PLANTS DISTRIBUTED FROM CASTLETON GARDENS.

Sold.

Economic Plants	71
Ornamental Plants	1,112
	1,183

Transferred to Hope.

Economic Plants	585
Ornamental Plants	14,642
	15,227
Total number of Economic Plants	656
Total number of Ornamental Plants	15,754
	16,410
Total number of Plants distributed	16,410

3. PUBLIC GARDENS, KINGSTON.

The general routine work of billing lawns, weeding, forking, manuring and watering beds and borders was constantly attended to and the Park was kept at all times in a fairly clean and tidy condition.

The Memorial Square has been maintained in a tidy condition during the year. The lawns were mowed and the beds weeded and watered.

The site of the old Treasury building in Harbour Street was turned over to the care of this Department during the year. The site was levelled and planted in Bahama grass and pipes laid down for watering and keeping the lawn in good condition.

General pruning of the street trees was regularly attended to and the trees kept within bounds. The small gardens near the Public Buildings were kept in good order during the year.

4. HILL GARDENS, CINCHONA.

All the beds and borders have been cultivated and are in good order. The grass on the lawns, terraces and slopes has been regularly cut and the various walks and pathways through the gardens weeded and kept in a neat condition.

During the year Capt. A. W. Hill, Director of the Royal Botanic Gardens, Kew, paid a visit to these gardens.

5. KING'S HOUSE GARDENS.

During Sir Leslie Probyn's office as Governor of Jamaica, the King's House Gardens were carried on under the supervision of Lady Probyn who was a keen gardener, this Department being responsible for the administration of the vote. The supervision of the Gardens is again being carried on by this Department since the departure of Sir Leslie Probyn.

The somewhat extensive lawns were regularly mown and kept in good order.

Some of the walks which were damaged by the heavy rains were re-metalled and are now in a fairly good condition.

The usual operations in connection with the upkeep of the gardens were carried out regularly and a neat appearance was always maintained about the grounds.

6. GORDON TOWN GARDEN.

This small garden, which was donated by Governor Olivier, is situated in the centre of Gordon Town and is chiefly used as a place of rest for visitors. A gardener is sent from Hope fortnightly to keep it tidy.

7. BATH GARDEN AND NURSERY (ST. THOMAS).

Mr. H. G. Coote, Inspector of Plant Diseases, is in charge of this Garden and reports as follows:—

During the year under review the old scrubby plants were removed from the garden, the entire area sectionised, and the many varieties of plants re-arranged. These plants met with favourable weather and have done splendidly and the garden now presents a pleasing appearance.

Nursery.—The pinery is now in full bearing and a good crop is expected.

The demand for Coconuts has again been slow but a good supply of plants was kept in stock.

Over 1,000 Nutmeg seedlings have been distributed and there is a good supply on hand. The demand has been good.

A small cane nursery consisting of eighteen standard varieties including the Uba has been established. There is a big demand for the Uba and the B.H. 10 (12).

8. MONTPELIER EXPERIMENT STATION AND NURSERIES, (ST. JAMES).

Mr. N. R. McHardy, Inspector of Plant Diseases, who was in charge of this Nursery reports as follows:—

Owing to the votes for the upkeep of Nurseries being reduced this Nursery was closed on the 30th April. All the cane varieties which are susceptible to Mosaic Disease were dug out and the nursery with several plots of Uba was handed over to Mr. J. W. Edwards from whom the land was rented.

During the period, January to April, 204,904 cuttings were distributed as follows:—

Uba	..	200,800
White Transparent	..	400
B.H. 10 (12)	..	750
J. 72	..	2,954
		204,904

9. DENBIGH, BELLE PLAIN, AND RETREAT NURSERIES (CLARENDON).

Mr. W. H. Redpath, Inspector of Plant Diseases, is in charge of the above Nurseries and reports as follows:—

Denbigh Nursery.—The Hon. G. W. Muirhead, Custos of Clarendon, gave 14 acres of land on Denbigh Estate for this nursery in which Uba Cane is grown for supplying tops to small farmers and others in Mid-Clarendon whose fields are heavily infected with Mosaic Disease. This nursery was started in 1923, but owing to the prolonged drought was not thoroughly established until 1924.

During the year the Hon. G. W. Muirhead was good enough to lend a well near the nursery for supplying water for irrigation and a "Sawyer Marsey" Portable Boiler and "Paugye" Pump were obtained and used during the drought to establish the nursery.

211,200 Uba tops have already been distributed and there will be a large number available for distribution during the following year.

Belle Plain Nursery.—Five acres of land was acquired from the Crown Lands at Belle Plain and planted out with Uba cane during August. The nursery is now well established and tops will be available during the year.

Retreat Nursery.—Mr. T. B. Thompson, J.P., of May Pen gave 1½ acres of land on Retreat Estate, of which he is in charge, for establishing a nursery. This nursery also is planted in Uba cane and will supply tops to the small farmers in the district of Rock River. Tops will be ready for distribution from this nursery about the middle of the following year.

10. DANKS NURSERY.

Mr. C. E. Scott is in charge of this nursery in which the Uba has been planted to supply tops to the small settlers in the district where the Mosaic Disease is prevalent. Tops will be ready for distribution during the coming year.

11. SUMMARY OF PLANTS DISTRIBUTED BY THE DEPARTMENT DURING THE LAST THREE YEARS.

	1924.	1923.	1922.
Cacao	223	1,570	15,181
Citrus	3,496	4,009	4,460
Nutmeg	1,431	878	651
Eucalyptus	183	333	291
Cane Tops and Cuttings	937,489	454,306	749,814
Misc. Fruit and Economic Plants including Timber Trees ..	10,010	16,803	11,133
Ornamental Plants	31,183	29,664	25,279
	984,015	507,563	806,809

12. The Garden and Plantation Sales for the past three years have been as follows:—

	1924	1923	1922	£	s.	d.
.. .. .	..	..	..	£677	2	3
.. .. .	..	..	..	652	7	0
.. .. .	..	..	..	456	2	8

M. S. GOODMAN,

Superintendent.

REPORT OF THE HORTICULTURIST.

1. HOPE GARDENS.

Orchids.—A good number of valuable additions were made to the orchid collection by the practice of exchanging our native species for foreign varieties with orchid growers abroad.

The collection of hybrid Cattleyas mentioned in the last Annual Report is in excellent condition and it is pleasing to note the keen interest being shown by the public in the orchids since these new varieties were imported.

The Divi-divi walk provides an ideal place for the growing and arranging for effect of a large variety of orchidaceous plants. It affords many different positions with varying degrees of light and shade to meet the requirements of the different species included in our orchid collection.

Hippeastrums.—The finest flowers among our selected varieties were cross-pollinated and a large number of seedlings raised.

H. Nehrling, Esq., F.L.S., Florida, supplied us with a quantity of seed obtained from his choice collection of *Hippeastrums*. A new site near the nursery is being prepared for these seedlings, our intention being to raise a large number of these bulbous plants for sale as they are in great demand after their flowering season.

Caladiums.—We obtained a very fine collection of fancy-leaved caladiums from Mr. H. Nehrling in exchange for other seeds. They attracted considerable attention and were much admired by the public when they were exhibited in the Show Houses. As numerous inquiries are received for the purchase of these plants an effort is being made to obtain bulbs of the most brilliant varieties for sale.

Cannas.—After a lapse of several years these attractive plants have again been introduced into the garden for decorative purposes. They proved most successful under our liberal treatment with farm-yard manure and a copious supply of water. It has been decided to import some of the newer varieties with the object of finding varieties of horticultural merit.

Flowering Trees and Shrubs.—Good displays of colour were made by the numerous flowering trees and shrubs which the garden is justly noted for. Among the exotic specimens that were much admired when in bloom were: *Camoensia maxima* described as the most beautiful of all tropical climbers; *Beaumontia grandiflora*, a vigorous climber with large, white, fragrant, bell-shaped flowers; *Congea tomentosa*; *Bignonia venusta*; *Bignonia magnifica*; *Petrea volubilis* var. *alba*; *Porana paniculata*; *Clerodendron Thomsonæ* var. *magnifica*; *Landolphia senegalensis*. All of these climbers bloomed most profusely in their respective seasons while again rivalling them in beauty were many flowering trees, namely, *Colvillea racemosa*; *Spathodea campanulata*; *Triplaris surinamensis*; *Kigelia pinnata* (Sausage Tree); *Couroupita guianensis* (Canon Ball Tree); *Michelia champaca*; *Lagerstroemia flos regina*, etc.

Bougainvillea.—The satisfactory way in which Bougainvilleas adapt themselves to our somewhat dry conditions and their profuse habit of flowering practically the whole year has made them one of the most popular flowering shrubs for mass effect in the Gardens. Efforts are constantly being made to produce new shades of colour by cross fertilising the varieties already introduced here. A number of seedlings from these crosses have been raised but invariably we find that when they flower the majority of them revert to the common purple shades.

Among the last lot of seedlings to flower there has appeared a variety with bracts of a pinkish shade much resembling the rare variety *Rosa Catalina* in colouring and habit of growth. It propagates readily from cuttings whereas with the variety *Rosa Catalina* much difficulty has been met with in propagating. A few plants have been obtained by approach grafting, all other methods of propagation having failed.

to establish healthy plants. A number of plants were raised from cuttings and grew vigorously for a certain period after which they developed a form of leaf disease the result being a gradual deterioration of the health of the plant.

It will be observed that our introduction of a seedling variety similar in colour to the *Rosa Catalina* and which has the additional merit of being readily propagated from cuttings will make possible a distribution of the most delicately coloured of all the Bougainvilleas for which there is sure to be a demand.

Begonia rex.—Several varieties of *Begonia rex* which were recently imported have made satisfactory growth and will shortly be available for propagating for nursery stock.

Gloxinias.—A number of bulbs of the choicest varieties were imported from England for the Show Houses. Seed of selected varieties was also obtained and a number of young plants are now in the seedling stage.

Rose Garden.—Further progress was made in the work of double trenching the Rose beds, the majority of which were again planted with the Maman Cochet rose. For a regular supply of cut blooms of good quality no other rose has yet proved itself equal to the Maman Cochet with its habit of continuous blooming under the climatic conditions that prevail at Hope. A considerable number of varieties have been tested but invariably they have proved unsuitable for our dry tropical climate. For this purpose another selection of rose trees consisting of 63 varieties, budded on brier stock, was received from Ireland. The plants arrived in December in excellent condition and are now fairly established.

Ficus Benjamina.—Six plants of a variety of *Ficus Benjamina* were received from the Department of Agriculture, Barbados. In their habit of growth they much resemble the variety already introduced here. The chief characteristic of the Barbados variety is, no doubt, the large yellow fruits which it bears while the fruits of the garden specimen are of a reddish tint and very small.

Plant Houses.—A continual display of colour was maintained in the Plant Houses through the agency of such plants as Caladiums, Crotons, Anthuriums, Begonias, Orchids, Ferns, and many other decorative subjects.

2. CASTLETON GARDENS.

Amherstia nobilis.—The trees of *Amherstia nobilis* growing near the entrance to the Gardens attracted considerable attention during their flowering season. Efforts were again made to obtain seed by hand fertilization but no results were obtained. The *Amherstia* does remarkably well at Castleton and flowers most profusely, yet it has never been known to seed here.

An effort has been made to obtain seed from Burma, but so far, we have not been successful.

Victoria regia.—An excellent specimen of the queen of all water lilies was exhibited in the lily tank. The flower of this wonderful aquatic plant when it first unfolds is white with a pink centre; the colour spreads as the bloom increases in age and at a day old the whole is rose-coloured.

Ravenala madagascariensis.—The Travellers Tree of Madagascar is one of the most striking trees in the gardens. It is a member of the Banana family and the trunk is made up of sheaths of leaf stalks. At the top the upper leaves are in two rows, with long stalks, arranged like an enormous fan. The blades of the leaf are used for thatch. The flowers are individually much like the banana but they are supported by large bracts arranged in two rows along the stalk. The seeds are edible and are covered with a blue pulpy substance which yields an essential oil.

Mangosteen (Garcinia mangostana).—The celebrated mangosteen is represented in the Gardens by several fully developed specimens from which a quantity of fruit is usually obtained in the early months of the year. The fruits are of a spherical form of the size of a small orange. Its succulent rind is nearly one-fourth of an inch in thickness. It contains a very powerful astringent juice and in wet weather exudes a yellow gum which is a variety of gamboge. On removing the rind its esculent substance appears in the form of a juicy pulp having the whiteness and solubility of snow and a refreshing delicate flavour. This tree requires a hot, humid climate to arrive at perfection, therefore it is not surprising to find the mangosteen thriving so well in the Gardens where such climatic conditions prevail.

Sapucaia Nut. (Lecythis sabucajo).—This tree, a native of the forests of Brazil, is well represented by several lofty specimens. Sapucaia nuts, the seeds of this tree, are closely allied to the well-known Brazil nuts. They have a hard, grooved shell and are enclosed in a large urn-shaped seed vessel about six inches across with a lid at the top. When the seeds are ripe the lid falls away and the seeds are scattered. The trees in the Gardens bear a fair quantity of nuts every year.

3. PUBLIC GARDENS, KINGSTON.

Ficus lucida.—The large tree of *Ficus lucida* which was growing near the Court House died suddenly during the early part of the year. Its enormous proportions covered a large area, consequently, when the dead tree was removed a large plot of land was laid bare. This land was immediately prepared and planted with flowering shrubs so that within a comparatively short period the vacant land was converted into an attractive border. Young trees of *Tecoma spectabilis* have been planted through the border with the object of hiding the building in the background.

Ficus Benjamina.—A plant of *Ficus Benjamina* from Barbados was planted to the south of the Park on one of the triangular lawns.

Rosary.—The enclosed rose garden to the northwest of the Park has been remodelled. Beds of an ornamental design have been laid out in place of the long uniform beds with grass pathways between. The beds were well prepared. Holes about 2 ft. deep were opened up and a quantity of manure used in preparing the soil. The vigorous growth which the plants have made together with the display of bloom now to be seen in the rose garden, fully illustrate the benefits derived from intensified cultivation, a practice that is not yet fully recognised as being of any importance by the public in general.

Aquatics.—The central tank was cleared and fresh mounds of soil prepared for growing the Nymphaeas. A large mound has been prepared in the centre of the tank to receive a plant of *Victoria regia* which is at present in a young stage of growth at Castleton Gardens.

4. HILL GARDENS.

The maintenance vote for these Gardens is very small, consequently very little progress can be made in developing the garden beyond keeping the grounds and immediate surroundings in a tidy condition.

Rosary.—The twenty-five rose plants, mention of which was made in the last Annual Report, have, with a few exceptions, failed to develop the strong, healthy growth and free blooming habits of the varieties already introduced here. Among the varieties that were received only three can be considered of good merit for the Hill Gardens, viz., George Dickson, Marie Van Houtte, and Queen Mary. Cuttings have been taken of each of the twenty-five varieties so that they may be tested on their own roots as it often occurs that some varieties grow better on their own roots than when budded on brier stock.

Ornamental Trees and Plants.—Maidenhair Tree (*Ginkgo biloba*). A small plant of this beautiful Japanese tree has been planted on the side lawn leading to the nursery. The Maidenhair Tree is a large Japanese tree of much botanical interest and of singular appearance. It attains a height of sixty to eighty feet and has a straight trunk with a pyramidal head. The leaves are fan-shaped, deciduous leathery, and notched, and have numerous closely-set forking veins like those of ferns. The flowers are dioecious. This tree is largely cultivated in Japan and China where it is used extensively for shade and ornamental purposes.

Crinum Powellii.—Two bulbs of *Crinum Powellii* were received from the Royal Botanic Gardens, Kew. They were planted in the lower border where they have developed excellent growth.

Fruit Trees.—Nine Peach trees were received from the U.S. Department of Agriculture for trial in the Garden. Eight plants have been established in the lower nursery, one tree having failed to grow.

Tree Tomato (*Cyphomandra betacea*).—A good number of plants of this excellent dessert fruit were raised from seed and planted in the lower nursery. As a source of revenue this plant might be more extensively grown in the Garden as there is usually a good demand for its excellent fruits in the local market.

Loquat (*Photinia japonica*).—A number of Loquat trees were also established in the nursery during the past year.

Timber Trees.—Seeds of Juniper Cedar (*Juniperus Bermudiana*) were collected from the trees in the plantation and sown in the nursery. Young plants are kept in stock to supply local demands.

E. DOWNES,
Horticulturist.

III.—AGRICULTURAL EXPERIMENTS.

REPORT OF SUPERINTENDENT OF AGRICULTURE.

The year 1924 has been marked by more determined efforts to eradicate Mosaic Disease from the sugar cane areas of the Island than has hitherto been the case. It is most gratifying to me to report that this effort has met with success, success in proportion to the thoroughness and continuity of effort displayed by the planters on their individual estates or holdings. The Uba Cane has been a most valuable asset in this respect, in that where heavy infection prevailed, it has been possible to replant this field or area with Uba and so reduce the area of actual infected cane on the estate and at the same time eliminate the heavily infected area which allowed of concentration of effort on the less infected and smaller area of cultivation remaining.

The position with respect to Mosaic Disease in the various parishes or sections thereof at the present moment may be briefly summarised as follows:—

Trelawny.—A most successful campaign has been carried through in this area, in that the Disease has been reduced from a rapidly gaining position to that of impotence.

On the majority of estates it is difficult to find a diseased cane and the general average of infection does not run over 1 or 2 diseased cane to the acre. One large Central with about 1,200 acres of cane is now paying at the rate of 3d. per root for diseased cane without finding any, where a year ago they were paying 4/ per 100 roots and good wages were obtained by the labourer at that. There is unfortunately one exception to this, and that is in the Queen of Spain's Valley where the Disease has such hold on the fields that it is now not possible to eradicate it by roguing or even replanting. The management of these estates are compelled to plant Uba as the only means of eradicating the disease. Fortunately the Uba cane does extremely well in this area, giving a higher tonnage, costing less to grow and ratooning better than the creole cane at the same time being immune to Mosaic. It has presented thus far no factory difficulty; it therefore seems possible that Mosaic Disease in this instance may be a blessing in disguise.

A comparative test of cane juices and milling was made at Hampden Estate during the year, comparing the Uba with the estate cane which is the ordinary ribbon cane. Canes were taken from two of the cane farms adjoining Hampden: Gales Valley where both plants and ratoons were tested and Tilston, where only plants were tested. The results are tabulated below:—

		Tonnage	Extraction.	Brix.
Gales Valley—				
Estate Plants	..	20	74.0%	20.35
Uba Plants	..	27	71.0%	19.45
Estate Ratoons	..	14	70.0%	20.05
Uba Ratoons	..	20	68. %	18.85
Tilston Estate—				
Estate Plants	..	18	70.0%	20.45
Uba Plants	..	25	67.0%	17.65

It will be noticed that in all cases the sugar content of both canes is high, in fact above the general average: though in all cases is the estate cane sweeter than the Uba. It would also be noted that the crushing of both canes is very satisfactory though in every case is the estate cane somewhat better.

The Uba Cane, both as plants and ratoons, on both places has given a greater tonnage—ranging from 35% gain as plants to 43 as ratoons. The Overseer, Mr. Milliner, assures me that they are quite satisfied with the Uba as they find it to be a better drought resister, a cheaper cane to cultivate, giving from 25% more cane to the acre, and an absolute solution to their Mosaic Disease problem.

The parish of Trelawny has planted about 376 acres of Uba of which Gales Valley, Hampden and Tilston have 156 acres. The Uba Cane promises to be a valuable asset apart from its value as an immune cane to Mosaic Disease, in what may be termed its value as a "poor-land" cane. In this direction it is being more and more appreciated. There is a section of 100 acres at Long Pond Estate which has recently been planted in Uba, which land has hitherto failed to grow any other cane. So far the Uba promises to give a useful tonnage and so send up the total output of the factory.

The Mosaic Disease is widely distributed among the Small Settlers' cane cultivations, and this is largely to be accounted for in the indiscriminate planting of diseased tops and the growing of corn either in conjunction with or near to cane before the passing of the Corn Order relative to Mosaic Disease. I must confess that this matter of the Small Settlers is a difficult one to deal with—mere instruction is not going to solve the matter—and it will require rigid inspection of the fields and the prosecution of all offenders against the law if effective work is to be accomplished in this direction. Ulster Spring and Troy districts have the largest area of Small Settlers' cane in the parish and show a high percentage of disease. Mr. Reginald Aitken of Freeman's Hall Estate, in this district, has offered Uba tops free of cost to any one who wishes them. So far he tells me only two men have availed themselves of this generous offer.

It was suggested in some quarters that the Uba Cane was unsuitable for the Small Settler as it was thought his mill would not handle the cane, and at the request of the Agricultural Society a test was made to determine this. An ordinary Chattanooga milling plant was selected in the York district of Trelawny and a thorough test was made from grinding to the manufacture of the sugar. The following facts were revealed:—

1. The time to grind equal weights of both canes was approximately the same.
2. That the average pull on the bar was less in the case of the Uba.
3. That there was a loss of juice in the case of the Uba due to high fibre content of about 7%.
(This was more than compensated for by a gain of 30% and over in the field tonnage by the Uba.)
4. No special adjustment of the mill was required, both canes being ground with the same setting.
5. The sugar of both canes was good, though the Uba was of a finer grain and not so sweet having a slightly brackish taste which did not in any way affect its sale.

St. James.—In St. James a useful comparative test of the value of the Uba Cane was made at Rose Hall Estate by Mr. W. C. Parkin the Overseer. Mr. Parkin has kindly given me the following figures:

			Tons per Acre.	Degs. Brix.
Rose Hall Estate Cane Plants	..	..	21.4	18.05
B.H.10.12	..	..	21.6	21.65
Uba	..	..	21.9	18.65
Estate Cane Ratoon	..	..	13.0	18.85
Uba	..	..	15.2	20.05

It will be noticed that as plants the Uba gave the heaviest tonnage and its juice was slightly better than that of the estate cane. As ratoons the Uba gave a heavier tonnage and a better juice.

Westmoreland.—Westmoreland has given us the greatest concern with regard to Mosaic Disease, for two principal reasons. First, the rapid and extensive spread of the disease, especially in the spring of the year and, secondly, the difficulty of getting really energetic and systematic work done by the planters for the eradication of the disease. There are, I am glad to say, exceptions to this statement. I am pleased at this juncture to report a considerable improvement in the second feature followed by a consequent improvement in the first point.

Within the last three months there has been a marked reduction of disease in the parish due to the following reasons:—

1. The replanting of heavily infected fields with Uba Cane.
2. The increasing practice of Fall planting instead of Spring planting. As it was found that Spring plants suffered more from the Disease than did Fall plants.
3. The more careful selection of tops for planting.
4. A closer and more careful roguing of the fields.

The Uba Cane is rapidly being extended and we shall this crop be in a position to determine its exact value in all parts of the Island. In Westmoreland there will be about 500 acres to cut this crop and nearly 1,000 acres planted for next crop. In Westmoreland as in Trelawny the Uba is finding a useful place as a "poor-land" cane of which there are large areas awaiting development. A comparative test of Uba and Estate Cane was made at Blackheath with the following results:—

The Uba gave 37½ tons of cane per acre at 16 months old, the juice at 10½ Beaume, while the Estate Cane for the same period of growth gave from 25 to 30 tons per acre, the juice standing the same.

St. Catherine.—The position in St. Catherine has shown marked improvement within the year. The Bernard Lodge Estates by systematic roguing of plants and ratoons and the keeping of careful watch on the Disease by recording the number of diseased cane taken from each field at each roguing have reduced the disease in the course of a year from an average infection of 2% to less than 2 diseased roots per acre. Mr. Caryll the planting Attorney, is to be congratulated on these results.

At Caymanas Estate Mr. P. A. Bovell, the Manager, reports a decrease of the disease due to the careful selecting of tops for planting and systematic roguing. This estate has planted nearly 100 acres of Uba which was put in on bad infected fields when replanting them. The B.H.10.12 has done extremely well there giving as plants under estate conditions 57, 58 and 63 tons of cane per acre, while the White Transparent of the same age gave from 35 to 45 tons. B.H.10.12 as a first ratoon gave 44 tons per acre. The Ba 11569 has shown up well on the lagoon soil but has proved unsuitable for the lighter soils. Observations made by the Overseer and Bookkeepers of this estate lead them to believe that the B3412 has the power of throwing off Mosaic disease after once having contracted it. I have therefore marked carefully canes of this variety affected with the disease and these are being kept under observation. The point is interesting. At Fellowship Hall the Uba Cane is proving valuable on the heavy brackish soil in this section of the parish. There are now planted nearly 100 acres of Uba in this area and it is being extended. I saw a field which would not grow or hold the ordinary cane and which showed gall-spots in some cases of a half acre in extent, producing an even healthy crop of Uba.

At Inns Wood Estate where there are 500 acres in cane a general reduction of the disease is reported to have taken place during the year. A general infection of 5% has been reduced to 2% and in many fields much less than this. This has been accomplished by careful roguing and the proper selection of tops.

In the Bog Walk area a general reduction of the disease has taken place due to the extensive planting of Uba which has proved very successful on these soils. This district has about 1,500 acres under cultivation of which about 800 acres are in Uba. A striking feature of this year's planting is the general absence of Mosaic disease in the Fall plants. The Uba Cane in this section gives an average of 25% more cane to the acre than the ordinary Creole Cane and costs much less to cultivate. It has in this section of the country very strong supporters for its many excellent qualities. A prominent planter in this area told me that he hopes the day will come when he will plant nothing but Uba as he found it the best proposition.

At Worthy Park encouraging results have been had in a section of about 150 acres which was badly infected with Mosaic Disease ranging from 50 to 75%. This section was subsequently cleaned, ploughed and replanted. It now shows less than 1% and has been kept in this condition by continuous roguing. This demonstrates quite plainly that Mosaic Disease is controllable and is not soil borne.

Vere.—The Disease in Vere has been kept well under control during the year. Several estates showing a reduction of infection others holding it down to a harmless condition. There were two spots in the parish which were badly infected. These have been destroyed so that Vere may now be considered in a sound position as in no case does the disease exceed 1%, and in the majority of instances it is much less than this.

In Central Clarendon, May Pen area, the position is not as healthy as I should like to see it. One large Central there is having an ever increasing amount of disease, due to neglect of proper methods of eradication. They are planting Uba extensively, but at the same time more energetic methods of roguing would save them ultimately great loss. I have repeatedly brought this matter to the attention of the Owner and Overseers. Other large estates in this district show a healthy condition. One of them, Denbigh Estate, is now virtually free of disease, due to the energetic and consistent work of Mr. W. H. Redpath, the Overseer.

Mr. Redpath, who is the Plant Disease Inspector for this District, and who has taken great interest in eradicating the Disease from this area, reports the Small Settlers of this district show a general reduction of disease due to roguing and replanting. There are about 740 acres of Uba planted in this area all together which is doing well, and is being rapidly extended. The crop will be from 50 to 60% better than last year. Should the prices be good, that is, not less than 20/ per ton for cane, it would be reasonable to expect a reduction of the debt owed the Government by these Small Settlers, lent them in a time of distress.

It was necessary in this area to prosecute three men for neglect in observance of the Corn Order. We obtained convictions and this should have a healthy effect in the district. It will be impossible to control the disease in this area in particular, unless observance of this order is carried out.

Nurseries.—After a considerable amount of disappointment due to the long and exhausting drought at the beginning of the year, we have thoroughly established the three nurseries in Mid Clarendon. The nursery at Danks has been re-started, and planted in Uba Cane, which is now thoroughly established, and will provide over 300,000 tops and cuttings for the Spring planting. Of the Mid-Clarendon nurseries, the one at Denbigh, is the largest, being 15 acres in extent, planted on land given us by the Custos, the Hon. Geo. Muirhead. This particular nursery had to be re-planted four times; each time it was planted the drought killed the cane before it could be established. It was not until Mr. Chas. Doorly, when Acting Colonial Secretary, came to the parish, and arranged for the P. W. Department to loan us a pump and engine for pumping water from an old well on the site, that we finally succeeded in making a satisfactory start. It is satisfactory to record that from this nursery we have already distributed 211,000 tops or enough to plant 50 acres of Uba, and there is a reserve of nearly 2,000,000 awaiting distribution, for which there is local demand. There will be no shortage of tops this Spring in Clarendon.

The Westmoreland nurseries were abandoned by the Department at the beginning of the financial year, as there were no funds available to run them; the vote for nurseries having been reduced by the Legislature by £500. The Hon. Hugh Clarke, Custos of Westmoreland, generously arranged to carry on the nursery at Robin's River, for the benefit of the planters, as did also Mrs. Whitelock, at Bulstrode. On both these nurseries there has been a heavy demand for tops though in the case of Robin's River it was found that the transport was too far, and all the available tops have not been taken.

Agricultural Director of Porto Rico.—We had, at the beginning of the year, a visit from the Director of Agriculture of Porto Rico, Signor Menendez Ramos, M.Sc. It was my pleasure and privilege to conduct this gentleman around the Island, taking him to the principal Sugar Centrals. A public meeting was held at Sav-la-Mar, which was largely attended by all interested in Cane. At this meeting Mr. Menendez gave an interesting and instructive lecture on the Mosaic Disease of Cane, which was most helpful to our work. Mr. Menendez was also able to assure the planters that in Porto Rico they had

found the Uba Cane a most useful one, and that there, as here, it was found to be indispensable in the fight against Mosaic Disease. He further assured them that they had in Porto Rico no trouble with the juice in the factory. Mr. Menendez thought our methods of work in the eradication of the Disease satisfactory and efficient, and expressed himself as pleased with the results we were attaining.

Plant Disease Inspectors.—I would draw your attention to the excellent work rendered by Messrs. Tucker and Kirkham—Plant Disease Inspectors—whose services have been disposed of on account of the financial condition of the Colony. These gentlemen have given me every assistance, and have taken the keenest interest in the campaign, apart from any personal advantage they may have received therefrom. They have rendered valuable services to the planters and Department in a time of need, and I greatly regret that it is not possible to continue their services, as they are urgently needed.

P. W. MURRAY,
Superintendent of Agriculture.

REPORT OF THE PLANT BREEDER ON THE EXPERIMENT STATION FOR THE YEAR ENDING 31ST DECEMBER, 1924.

Canes.—There has been a great demand for cane tops this year and although the prolonged drought of 1923 continued to the middle of the year and affected the growth of the canes, 421,385 tops have been distributed. This is the second largest number of tops on record as having been distributed in any one year from the Experiment Station. There was a great demand for tops of the Uba and B.H. 10 (12), and this demand was met in a limited way. The cultivation of the B.H. 10 (12) is being increased to meet the demand for this variety. A large number of Uba tops were distributed to the Small Settlers whose fields were almost destroyed by the ravages of Mosaic Disease.

The discontinuance of some of the nurseries about the Island is no doubt responsible for the numerous applications for tops from the Experiment Station and it was a big strain on us to meet these demands from our limited area under cane cultivation.

The plot of B.H. 10 (12) which was planted in the old Mango Grove during October last year, was distributed during November and December this year, and a total of 45,500 cuttings were distributed from this plot which is a little over half an acre.

The cultivation of the Mexican Striped and Badila has been extended and they have made good growth. A small quantity of cuttings of these varieties can now be distributed.

The Uba hybrid seedlings which were obtained in 1922 were very poor, and a selection of only three was made. These were replanted and have made very poor growth when compared with the other varieties. On none of these three hybrid seedlings has so far been found any symptoms of Mosaic Disease. Cuttings of these hybrids will be sent out to estates on which Mosaic is prevalent to be tested with regard to their resistance or immunity to Mosaic Disease.

The seedlings obtained in 1922 have all been discarded owing to their being susceptible to Mosaic Disease. Those obtained last year were also all discarded. No Uba hybrids were obtained last year as unfortunately the Uba did not flower.

During October and November this year the Uba flowered freely, and another attempt was made at crossing the Uba with some of the hardier and more resistant varieties to Mosaic Disease. This work was done on estates in Clarendon and St. Catherine and also at the Hope Experiment Station. Unfortunately, on the estate in Clarendon, when the work was done, the bags enclosing the arrows were stolen which made the effort to obtain hybrid seedlings on this estate negligible.

The seed obtained in St. Catherine and at Hope will be sown during January, and it is hoped that a large number of seedlings will be obtained.

I should like to record my appreciation of the assistance rendered me on these estates in carrying out the work of hybridising.

Several fields of old ratoon canes have been re-planted. The old stools were dug out, the fields ploughed and cross-ploughed, trenched, and replanted with Uba and other promising seedling varieties for which there is a demand.

Pines.—An acre of ratoon pines was pulled up and the beds ploughed, pulverised, and replanted with Sugar-loaf, Ripley and Red Spanish. A good crop of pineapples was obtained, but owing to the prolonged drought the crop was not as large as in previous years. The most of the crop was sold to the Permanent Exhibitions Committee for shipment to the Wembley Exhibition.

Mangoes.—Several of the mango trees in the mango grove died this year. These will not be replaced as the grove is already over-crowded. Budding during the early part of the year was almost a failure, but during the latter part of the year, after the rains fell, a fair amount of budding was done on the trees in the borders with success. Several of the common mango trees have been cut back for budding. The two varieties, *Fernandez* and *Gopal Bhog* fruited for the first time this year, but they are not considered as good in quality as the Bombay.

Bananas.—During the year the banana plot was extended to about one acre and is composed of the following varieties:—Gros Michel, Otaheite, Black, Tiger, Rubra, Robusta, Apple, Ram Kelat, Sulphur, Honey, White House, Kewensis, Rosea, and China. There is also a small plot of the Canary Banana which was imported in February from the Canary Islands with the view of comparing this variety with what is known here as the China or Dwarf (*Musa Cavendishii*). Nearly all of the trees have fruited and we can see no difference between these two varieties of Banana.

All the other varieties mentioned above are in a healthy condition. Several of the Robusta, Kewensis, and Rosea have already fruited. Pollen from the two last-named varieties has been used for cross-pollinating the Canary, China and Robusta. The pollen of the Robusta has also been used for pollinating the Gros Michel or Jamaica Banana.

One of the seedling bananas mentioned in last year's report was sent to Castleton, but, unfortunately, it died. The other two at Hope have made little growth.

Cacao.—The usual pruning was carried out. Several of the younger trees suffered severely during the early part of the year owing to the prolonged drought as no water was available for irrigating. With the advent of the rains, however, which fell during the latter part of the year, they have regained a fairly healthy condition. A large amount of vegetable manure was buried during the year. A few of the old trees have been cut back and gormandizers encouraged.

Coffee.—The annual pruning was done in January and a fairly large crop was reaped. Some of the long-top trees were attacked by a weevil which made tunnels in the stems of the trees and caused them to die. Several of the old trees have been taken out and replaced by young plants. The old Vanilla plot (*Vanilla planifolia*) has been planted in Coffee.

Cassava.—Of the bitter varieties only the Malta Hotel was cultivated. In the several tests carried out this variety has proved to be the heaviest bearer. A third test was carried out with the two sweet varieties, Jamaica White Stick and Trinidad No. 15, which, so far, have both given about equally good results.

Citrus.—Spraying with Lime Sulphur was again carried out against the Black Fly with good results. The plot was ploughed and cultivated and a liberal supply of stable manure was spread around the trees. As a result the trees have responded well and are producing a heavy crop of fruits.

Grapes.—The general pruning was done in February, and the crop was a large one. Several of the vines were attacked by the Grape Weevil which did a lot of damage. These were successfully treated by squirting Carbon Bi-sulphide into the tunnels made by the weevil. Spraying with Bordeaux Mixture was also carried out during the year. The fall crop was destroyed by the heavy rains which fell at that time.

Guava.—The seedling guavas which were planted out during 1922, and which were grown from seed of a specially good guava, fruited this year, but they were very disappointing as none of the seedlings produced fruit as good as the parent. Experiments were carried out, with success, on the budding of guavas.

School Garden.—The usual crops of vegetables were cultivated by the students, but owing to the drought only the following produced good crops:—Peppers, Garden Egg budded on Soushumber, Cabbages, Tomatoes, and Pines.

Agricultural Education.—The Students of the Farm School continued to visit the Experiment Station and received instruction in the various crops mentioned above for five days each week. They have also done practical work in forking, ploughing, harrowing, mulching, irrigating, draining, preparation and application of fungicides and insecticides, budding, etc. The work on the cross-pollination of the bananas is also being done by the students who take a keen interest in this work.

Mr. L. A. Powell, the master in charge of the students in practical agriculture, has taken a keen interest in this part of his work and good results have been achieved.

M. S. GOODMAN,
Plant Breeder.

IV.—CONTAGIOUS DISEASES OF ANIMALS.

REPORT OF GOVERNMENT VETERINARY SURGEON.

Report on the incidence of Swine Fever during 1923 and 1924, Tick Control and other veterinary matters dealt with or observed during the period since my arrival on February 19th, 1923, and the 31st December, 1924.

1. *Swine Fever or Hog Cholera*.—During April of 1923, a disease of swine was reported at "Nightingale Grove" near the military camp in lower St. Andrew. Investigation proved the disease to be Swine Fever as several autopsies showed the typical lesions in the kidneys, the spleen, lymph glands and lungs. As far as could be determined the disease originated as the result of feeding garbage from the military camp and hotels in the city of Kingston. In this respect the outbreak is analogous to many occurrences and experiences with the disease in other countries. As a general rule the feeding of uncooked garbage to hogs results sooner or later in an occurrence of swine fever. Uncooked scraps of pork, such as the trimmings of ham and bacon, from hogs killed in the incubative stage of the disease have been shown by experimental feeding to be possible sources of outbreaks of the disease.

At "Nightingale Grove" the mortality was high. The owner lost all but 3 or 4 of his sixty hogs.

As a result of the discovery "Nightingale Grove" was declared an Infected Place in respect to Swine Fever and Rules and Regulations were made to deal with the disease under Law 29, 1922 (Vide Gazette May 3, 1923).

2. In late September, 1923, Swine Fever was reported and diagnosed in a fairly large area of western St. Thomas. Accordingly, an Infected Area was declared and a strenuous effort made to limit its spread by preventing the movement and the out-going of hogs from the Area. (Gazette, September 28, 1923).

Very shortly after this campaign under Mr. Alwyn Wright, Inspector under the Law, had yielded very encouraging results in limiting the extension of the infection it appeared in territory to the east and west of the first area. Accordingly the Infected Area was enlarged to include portions of St. Andrew and Kingston and additional sections in St. Thomas (Vide Gazette Extraordinary, December 22, 1923). Later and because of its further extension the Infected Area was again extended to embrace a greater area in St. Andrew and St. Thomas (Vide Gazette, January 24, 1924).

The legal quarantine on these Areas was revoked by Order "(The Contagious Diseases Animals (Inland) (Swine Fever) (Infected Places and Infected Areas) Revocation Order, 1924," as published in the Gazette, June 19, 1924.

These outbreaks have shown—

1. If Swine Fever is to be effectively limited to an Infected Area by isolation methods analogous to those employed against the outbreak of Foot-and-Mouth Disease the expense will be so great that it can not be justified. Hog raising in Jamaica, except on a very few premises, is not an industry. Nearly all the Small Settlers keep one, two or a few hogs. These animals, especially in the dry district, are allowed to roam and make a living as best they can. In other cases, and this applies to some of the larger holdings, a few pigs are kept merely as an incident in their operation and the owner knows so little about them that he can not state how many he has or where they are. Except, therefore for the styed, confined, and properly reared and fed hogs, one may say that they live in a semi-wild state. Under such conditions control of them in regard to the dissemination of Swine Fever infection is not possible.

2. This disease has periodically occurred and devastated the swine of many sections of the Island under the general name of "Hog Sick." Having become accustomed to its visitations most of the peasants take its occurrence as a matter of course, lose their pigs and when the disease has exhausted itself start again.

3. It appears that the only hope of dealing with the disease is to educate the owners as to its true nature and demonstrate to them what voluntary isolation and proper confinement of their hogs may accomplish during an outbreak. Further, that there is a method of vaccination, which under proper conditions of administration and subsequent care and feeding of the treated animals has proved very effective in protecting swine against the disease.

References to Swine Fever:—Gazettes, May 3, 1923; September 28, 1923 (Extraordinary); December, 22, 1923 (Extraordinary); January 24, 1923; June 19, 1924.

Anthrax.—Deaths of animals, particularly cattle, assigned by owners to Anthrax have on many occasions been reported during the last two years.

The following have been investigated personally by the writer:—

1. At "Grandvale" and "Forest" in eastern Westmoreland. Intermittent deaths, especially of cattle from 18-30 months of age have occurred on these properties. Repeated examinations have failed to show any conditions indicative of Anthrax. Bacteriologic tests have also been negative for this disease.

Although Anthrax has been excluded the actual disease has not been identified. The symptoms and post-mortem findings suggest a neurasthenic condition in no way associated with bacterial infection. For this reason chronic plant poisoning (possibly nightshade) has been suspected but not proved.

2. At "Robin's River," Westmoreland, a few cattle, usually 18-36 months of age are lost each year by sudden death accompanied by hemorrhage from the bowels and in less degree from the nostrils. Autopsies conducted on two specimens show the gross lesions of intestinal hemorrhagic septicæmia. This, however, has not been confirmed by bacteriological study.

3. Appleton Estate, St. Elizabeth. Losses of mature breeding cattle were investigated in March, 1924, because of a reported suspicion of Anthrax. Examination absolutely excluded Anthrax as the cause and indicated strongly a wasting condition due to flukes in animals recently introduced from the coastal plains.

4. Charlottenburg, St. Mary. As a result of the sudden death of a cow with bloody emissions from the natural openings, Anthrax was suspected. No subsequent deaths or sickness in the same pasture or among exposed animals occurred, accordingly no diagnosis was established.

5. Prospect Estate, Hanover. In February, 1924, the sudden death in quick succession of 3 working steers with swellings on the neck raised a suspicion of Anthrax. There was no sequel to the event.

6. During September, 1924, several deaths of cattle and sheep were reported around Newell and Pondside in St. Elizabeth. Measures were taken to see that the carcasses were burnt or buried. Three visits to the districts were made, but on each occasion no carcasses or sick animals were available for examination. However, it seems quite likely that this area is Anthrax infected, for deaths very suggestive of the disease appear to be the yearly experience of livestock owners of the localities.

7. Around Santa Cruz, St. Elizabeth. In November and December, 1924, several mysterious deaths of horsekind and cattle occurred around Santa Cruz (especially in the Bybrook and New River Districts). Visits for investigation were made, but on no occasion was the writer able to secure material or patients for examination. As there seemed good reason to suspect sporadic cases of the disease the Inspector of Police of the Parish was requested to have the police at Santa Cruz see to the proper disposal of carcasses. In addition Anthrax vaccine (double) was administered for protective purposes to several groups of animals in the district.

Gastric Strongylosis in Cattle.—This parasitic disease is quite common in many parts of the island. Only when exhibiting itself as an acute infection does its harmful effect on the growth and thrift of animals (especially the young) attract attention.

Necrotic Dermatitis and Necrosis of the Foot in Horsekind.—During and immediately subsequent to the wet season of 1924 (August-November) several cases of the above trouble were reported in St. James, Trelawny and Hanover.

When the milder cases were promptly treated with antiseptics and the animals placed in clean and well-drained places the condition usually healed rapidly. There were, however, cases where from its onset the disease appeared in an acute and deeply penetrating form. When such lesions were not promptly arrested by the liberal use of the hot iron they caused exfoliation of the hoofs, exposure of the tendons and tendon sheaths, metastatic pneumonia and terminated fatally.

Tuberculosis of Cattle.—No general study of this condition has been made. As it is essentially a very occult disease no estimate of its prevalence in dairy herds is possible without the use of the tuberculin test as a means of diagnosis.

Tuberculin tests were applied:—

1. November 13, 1924, to one Devon bull and 20 milch cows at Struie in Westmoreland. Result, no reactors.

2. November 21, 1924, to 214 mixed cattle (imported bulls, imported cows and grade cattle) at the Government Stud Farm at Grove Place, Manchester. Result, no reactors.

Red Water (Hæmaturia) of Cattle in Manchester.—In early October, 1923, a preliminary investigation was made of a frequently reported and recurrent condition of Red Water (bloody urine) in cattle in Southern Manchester. It was found that the disease was in no way a form or manifestation of the red urine (hæmoglobinuria) of tick fever (piroplasmosis) of cattle.

The chief lesions on post-mortem of affected subjects are:—

- (a) mortar-like collections in the tubular areas of the kidney—not always present.
- (b) a thickening of the bladder wall, sometimes 5 or 6 times greater than in the normal state.
- (c) stones or gravel in the bladder in some cases with attendant difficulty or complete interference with the passage of the urine.
- (d) papillomatous (soft wart-like) growths on the inner surface of the bladder from which blood continually seeps.
- (f) blood-tinged urine and blood clots of variable size in the bladder cavity.

From all accounts the disease has been observed in parts of Manchester since 1899 and has caused heavy losses on some properties from year to year. The area most severely affected is generally the vicinity of Newport westward to Watson Hill, southerly to Cross Keys and south-easterly in the valley of the Carpenter Mountains to Pratville.

As the lesions and cause of the disease are very analogous to Bilharziosis (a blood fluke disease) in man, and animals are also known to be affected with their own specific varieties of these flukes, examinations have been made to establish its true entity in this respect. So far, however, the incriminating fluke—a species of *Schistosoma*—has not been demonstrated.

Proceeding on the analogy mentioned, tartar emetic administered intravenously has been used as tentative treatment, and in the majority of cases has had some beneficial effect in the condition.

The incidence of the disease in a herd is variable. In some 2 to 5% are affected annually, in other cases small herds of 5 to 12 head have within 3 to 4 years been killed out by the disease. Very few animals once affected ever recover permanently; the bloody condition of the urine may clear up temporarily and spontaneously, but in a month or two relapses occur, the animals gradually lose flesh and strength and die of prostration or from obstruction of the urethra (stoppage of the urine).

Tick Eradication and Control under Law 41 of 1920.—During the time under review it has not been possible to do any systematic inspection of the extent to which stock owners are complying with the Law and the Orders made for tick control.

Incidental visits to properties show that in many cases owners are dipping their animals (horsekind and cattle) very regularly and with great benefit. In other cases only the cattle are dipped. This is regularly done on some properties, on others only when the cattle are very ticky.

Neglect and disregard of the Law is not uncommon and the effect on the cattle on such places is very evident.

At the end of 1924, two hundred and forty nine dipping tanks were registered. It is fair, therefore, to assume that tick control by the most effective method (dipping) is more general than it used to be.

It is not likely that the Law will in any measure accomplish its object until dipping is enforced under a resident inspector in each parish or other organised system of regular supervision.

Public Meetings attended in aid of Animal Health.—Under the auspices of the Branch Societies of the Jamaica Agricultural Society public meetings were attended at:—

- 1. Llandewey, St. Thomas, on May 19, 1924, subject "Swine Fever."
- 2. Seaforth, St. Thomas, on May 23, 1924, subject "Swine Fever."
- 3. Trinity Ville, St. Thomas, on May 23, 1924, subject "Swine Fever."
- 4. Pondside, St. Elizabeth, October 28, 1924, subject "Anthrax and its prevention."
- 5. Newell, St. Elizabeth, October 29, 1924, subject "Anthrax and its prevention."

S. LOCKETT,
Government Veterinary Surgeon.

6th March, 1925.

V.—PLANT DISEASES AND PESTS.

ADVISORY COMMITTEE ON THE BANANA INDUSTRY.

REPORT OF THE SECRETARY.

The Advisory Committee on the Banana Industry.—The members of the Board include the following:

J. Roy Johnson, Esq.
S. S. Stedman, Esq.
J. H. McPhail, Esq.
R. P. Simmonds, Esq.
C. J. Veitch, Esq.
The Director of Agriculture (Chairman) and
The Microbiologist (Secretary).

Four meetings of the Committee were held during the year.

Among the many items of importance discussed by the Committee at the meetings and also in correspondence were the following:—

Plant Disease Legislation.
The Immature Fruit Law.
The Exportation of Plants.
The Raising of Resistant Bananas.

The Director of Agriculture also submitted many administrative matters to the Committee for their advice.

The weekly reports of the Inspectors of Plant Diseases were circulated to the Committee to enable them to keep a check on the work being done in connection with the Panama Disease.

The official figures for cases of this Disease treated during the year 1924, are as follows:—

	No. of Diseased plants.	New Cases.	Recurrences.	Total cases.
January ..	721	61	235	296
February ..	706	57	265	322
March ..	638	52	198	250
April ..	377	51	136	187
May ..	484	49	171	220
June ..	409	18	220	238
July ..	450	45	164	209
August ..	463	30	183	213
September ..	478	43	142	185
October ..	717	71	245	316
November ..	549	80	165	245
December ..	706	63	267	330
Total for 1924	6,698	620	2,391	3,011
Total for 1923	4,007	528	1,376	1,904

During the past year it is evident that the disease has increased considerably in spite of all our efforts to control it. Of the cases treated during the year about 75% were in the parish of Portland.

The cases treated occurred in districts which had been infected during previous years, and showed that the disease was gradually increasing in these districts.

C. G. HANSFORD,

Microbiologist and Secretary to the Committee.

REPORT OF GOVERNMENT ENTOMOLOGIST.

Annual Report of Government Entomologist for the year ending December 31st, 1924.

2. The insects of economic importance dealt with during the period under review are referred to below under their food plants.

Banana.—The situation with regard to the Banana Borer, *Cosmopolites sordidus*, Germ., has improved considerably and remarkably so in view of the fact that the plantations throughout the island have suffered greatly owing to drought. This marked improvement is due to confidence having been established, somewhat belated, it is true, in the value of the trapping method and the destruction of the old 'bulbs' which function as breeding places for the insect. In St. Mary, in particular, this improvement is the most marked. A Manager of a large group of plantations, who started trapping and plant sanitation measures in 1920-21, states that he has reduced the borer to such an extent that it is now a negligible quantity. Unfortunately, though, the borer has been introduced into three new localities—Trinity Ville, Gayle and Boundbrook (near Port Antonio). However, particular attention is being paid

to the problem of control in these places and plots are being established in these localities to demonstrate the measures which should be adopted to control the pest. Demonstration plots have also been established at Balcarres and Glengoffe.

The Aphid, *Pentalonia nigronervosa*, Coq., was frequently found on the young leaves of young banana shoots.

Sugar Cane.—Several enquiries were received with regard to the Sugar Cane Mealy Bug, *Pseudococcus sacchari*, (Ckll.).

The Sugar Cane Moth Borer, *Diatraea saccharalis*, F., was very prevalent in several districts. The eggs, however, were highly parasitized by the small wasp, *Pentarthrum minutum*, (Riley).

A few cases of attacks by the Aphids, *Aphis sacchari* and *Sipha flava*, (Forbes), were observed on Uba Cane.

As in the previous year, caterpillars were very prevalent throughout the island on this crop and did great damage. The species concerned were the Fall Army Worm, *Laphygma frugiperda*, Sm. and Abb., the Sugar Cane Looper Cutworms, *Mocis repanda*, (F.), and *M. punctularis*, (Hubn.), and the Palm Caterpillar, *Hyblaea puera*, Cram. Towards the end of the year the fly parasites, *Frontina aletia*, Riley, and *Archytas piliventris*, (v.d. Wulp), as well as the Chalcid wasps, *Chalcis robusta*, Cröss., and *Spilochalcis femorata*, (F.), were much in evidence.

There was an attack of wide extent of the West Indian Cane Fly, *Saccharosydne* [Delphax] *sacchivora*, (Westw.), in Vere. The insects were so very numerous that the blackened effect on the foilage, due to the development of sooty mold on the secretion of the insects, was apparent from a distance. The eggs were parasitized by the minute wasp, *Anagrus armatus*, Ashm., and the predaceous Red Assassin Bug, *Zelus rubidus*, Lep. & Serv., was also numerous.

Pimento.—In Manchester there was a widespread attack on pimento of the scale insect, *Froggattiella pimentæ*, Newst., and of the 'White Fly,' *Aleurodicus pimentæ*, Lg. The latter is a new species.

Coconuts.—Complaints of attacks by the Shot Hole Borer, *Xyleborus perforans*, Woll., and the Sugar Cane Rhinoceros Beetle, *Strategus titanus* F., were received from one estate in St. Thomas.

Coffee.—The Hemispherical Scale, *Saissetia hemisphærica*, (Targ.), was very prevalent in certain districts of St. Thomas.

Enquiries were received from scattered districts with regard to the Cylindrical Beetle Borer, *Amphicerus* [Apatæ] *terebrans*, (Pall.).

Corn.—The Corn Earworm, *Chloridea obsoleta*, F., appeared to be much in evidence in the corn-growing districts, as was the case with the leafhopper, *Peregrinus maidis*, Ashm. The latter is important more on account of its being regarded by me as a potential vector of Mosaic Disease of sugar cane than on account of the actual direct damage it causes to corn or sugar cane.

Guinea Grass.—Penkeepers throughout the greater part of the Island were greatly troubled by the attacks on guinea grass by the same four species of caterpillars mentioned above as having attacked sugar cane. The attacks, however, did not prove to be as serious as in 1923.

Fruits.

Citrus.—As in previous years, the worse pests with which the citrus growers have had to contend are the Purple Scale, *Lepidosaphes beckii*, (Newm.), and the Snow Scale, *Hemichionaspis minor*, (Mask.), both of which, on account of their protective scales, are very resistant to spraying mixtures and it is, therefore, necessary to repeat frequently the spraying operations.

This year the long list of scale insects attacking Citrus has received another addition by the appearance of *Dianspis annae*, Mal., which species is recorded only from Java and Barbados.

Specimens of the 'White Ant,' *Nasutitermes pilifrons*, (Holmg.), were submitted with the information that they were attacking living wood of grapefruit.

With regard to the Black Fly, *Aleurocanthus woglumi*, Ashby, there is nothing new to add to my previous reports. I have recently received a new insecticide, "Citrus Dust," which the manufacturers claim to have been used successfully against 'White Flies' in Florida and with which I propose to experiment in the near future.

Cases have been noticed of the attacks on oranges and grapefruit of the thrips, *Heliothrips hæmorrhoidalis*, (Bouché), which has a long list of food plants and among which are mangoes and guavas.

Another thrips, *Aleurodothrips fasciapennis*, (Frankl.), appears to prey on the Black Fly and the Purple Scale.

Sour Sop.—This fruit is attacked by the scale insects, *Aspidiotus lataniae*, Sign., and the Coconut Mealy Bug, *Pseudococcus nipia*, (Mask.).

Guinea.—One complaint was received of the Cylindrical Beetle Borer, *Amphicerus terebrans*, (Pall.), boring into the stems of this tree.

Guava.—Comstock's Mealy Bug *Pseudococcus comstocki*, (Kuw.), was found on a guava tree. This species was not hitherto known to occur in Jamaica.

Mango.—The Mango Fruit Fly, *Anastrepha fraterculus*, (Wied.), was less prevalent than in 1921-23. The larvae were parasitized by the wasp, *Opius* (*Utetis*) *anastrephæ*, Vier.

One complaint was received of the Tree-hopper, *Pamula* sp., attacking the fruit stalks, resulting in the dropping of the young fruit.

Papaya.—One case was observed of the Horn Worm, *Erinnyis elope*, (Dru.), defoliating a Barbados variety of papaya.

Vegetables.

Enquiries were received with regard to insects attacking the following vegetables:

Cabbage.—The Aphid, *Aphis gossypii*, Glov., caterpillars of the Cabbage Butterflies, *Pontia monuste*, (L.), and *P. monuste*, (L.) var. *phileta*, (F.)

Yams.—The Yam Scale, *Aspidiotus hartii*, Ckll., and the Citrus Mealy Bug, *Pseudococcus citri*, (Risso).

Sweet Potatoes.—The Sweet Potato Weevil, *Cylas formicarius elegantulus*, Summ., was reported to be very prevalent in Trelawny and the Plant Bug, *Spartocera battatas*, F., in St. Thomas.

Cucumber.—The Plant Bug, *Anasa scorbatica*, F.

Congo Peas.—The Hemispherical Scale and the new species of scale insect, *Pseudaulonia subtessellata*, Lg. & Gr.; the Lace-wing Bug, *Corythucha gossypii*, (F.); the Stink Bug ("Mary Grudgful"), *Nezara marginata*, P. de B.; and the Congo Pea Girdler Beetle, *Oncideres amputator*, (F.).

The adults of the Congo Pea Girdler have long antennae, those of the male considerably longer than the body, but those of the female only trifle longer than the body. The body is cylindrical and the general colour is greyish brown, with a broad ashy-coloured band extending over the middle of the wing-covers. The eggs are white, elongate-oval and about 1/10 of an inch in length. They are deposited in the severed branches. The branches are apparently severed by the female in order that congenial conditions may be provided for the development of the larvae which are unable to live in wood containing sap. It is only the female that severs the branches, but both sexes feed on the tender bark and wood at the tips of the branches. The girdling is not done by a complete circling at once, but section by section is ringed until the entire branch is girdled; the girdling extends through the bark and well into the wood, but leaving a portion of the heart wood untouched so that the weight of the branch or the force of a slight wind is sufficient to cause the branch to snap. The eggs are deposited during or after the girdling process and are inserted singly beneath the bark or slightly in the wood near a bud or an off-shoot, usually in the main stem and in the major branches. The puncture in which the eggs are inserted is sealed with a gummy substance and the female girdles below that point. The number of eggs per branch varies from 1 to 30. Severed branches may be found without any eggs. The egg stage lasts about 18 days. The larvae are whitish, legless grubs. They tunnel in the severed branches, feeding only on the woody tissues leaving the bark intact, except that a few circular holes are made in the bark through which to get rid of the pellets of frass and excrement. The larval stage lasts about three months. When full grown the larvae close the ends of their galleries with frass, forming a chamber in which to transform to the pupal stage. On emerging from the pupal stage the adult beetle emerges through a circular hole gnawed through the bark.

In order to control this pest all that is possible is to gather and burn the several branches, those that have fallen to the ground and those that have lodged in the trees. By adopting this procedure the eggs and larvae, which would otherwise develop into beetles, will be destroyed and so the source of infestation will be eliminated.

Ornamental Trees and Shrubs.—Enquiries were received with regard to insects attacking the following ornamental trees and shrubs:

Poinciana.—Caterpillars of the Noctuid moth, *Lyncestis acontoides*, Guen.

Cannas.—Caterpillars of the butterfly, *Eudamus proteus*, (L.).

Hibiscus.—The Lace-wing, *Corythucha gossypii*, (F.).

Cassia.—The Ackee Fringed Scale, *Asterolecanium pustulans* (Ckll.), and another scale insect, *Aspidiotus herculaenus*, Doane & Hadd. The latter has not been hitherto recorded from Jamaica.

Cordia.—The Tortoise Beetle, *Eurytepla jamaicensis*, (L.).

Oleander.—The West Indian Peach Scale, *Aulacaspis pentagona*, (Targ.).

Agave spp.—The Flea Beetle, *Metachroma rosae*, Bry. This species also attacks roses and most probably sisal.

Roses.—The Articulated scale, *Selenaspidus articulatus*, (Morg.), and the Florida Red Scale, *Chrysomphalus aonidum*, (L.).

3. Relationship of Insects to Mosaic Disease of Sugar Cane.—Experiments were continued during the year with those insects, which I regard as being potential vectors of this disease. I succeeded after several attempts in transmitting the disease from mosaic-infected corn to sugar cane—B.H. 10 (12)—by means of the corn aphid, *Aphis maidis*, Fitch. The problem of the transmission of this disease in this island by insect vectors is, however, to my mind, by no means solved, for I am yet to be convinced that the transmission of the disease in Jamaica can be attributed wholly or to any great extent to the corn aphid, a species which I have not as yet observed attacking sugar cane in the field; and the same remarks, too, to a lesser extent, perhaps, hold good with regard to the other species, *A. sacchari* and *Sipha flava*, (Forbes), for only in a few instances have these species been observed on sugar cane. It is true that I have received several reports of outbreaks on sugar cane of insects said to be 'green fly' (Aphids), but such of those cases that it was possible for me to investigate, proved not to be 'green fly' but some other insect, such as the Green Leafhopper and even the West Indian Cane Fly. This confusion has arisen from the fact that entomologists restrict the use of the popular name of 'green fly' to the members of the family *Aphididae*, but in this country the term is apparently extended to include many of the small greenish insects.

In my opinion, an insect vector of mosaic disease of sugar cane must fulfil the following conditions: (a). Wide distribution and very prevalent; (b). Agile, and (c). Feed on the leaves near the growing point of the host plant. Now, *A. maidis* fulfils (b) and (c), but does not fulfil (a); *A. sacchari* and *S. flava* fulfil (b), but not (a) and (c). So, in spite of success with *A. maidis* and negative results with certain other insects, it seems to me that amongst such insects as the West Indian Cane Fly, the Green Leafhopper, *Kolla herbida*, Walk., and *Peregrinus maidis*, Ashm., is to be found a vector, or vectors, to which can be reasonably attributed the widespread incidence of the disease in this island.

As I have previously reported, my experiments with the Green Leafhopper, the West Indian Cane Fly and *P. maidis* resulted negatively. I shall, however, continue experimenting with these insects paying regard to such factors as:

(a). The length of time for which the insect is allowed to feed on the infected host.

(b). The length of time during which the insect might remain in the infective stage after feeding on the infected host.

(c). The possible variation in the virulency of the infective agent, depending on whether the disease is in the early stage or in a later stage.

(d). The possible variation in the infectivity of the nymph and adult stages of the insect.

4. Parasitic Insects—The following parasitic wasps were reared from the following insects of economic importance:

Parasite. $\frac{2}{4}$	Host.		Stage of Host.
	Scientific Name.	Popular Name.	
<i>Apanteles prenides</i> , Mues. . .	<i>Prenes nero</i> (F.)	Sugar Cane Moth	Larva
<i>Apanteles leucostigmus</i> , Ashm. . .	<i>Eudamus proteus</i> , (L.)	Canna Moth	Larva
<i>Apanteles americanus</i> , Lep. . .	<i>Protoparce sexta jamaicensis</i> , (Br.)	Tobacco Moth	Larva
<i>Apanteles congregatus</i> , Say. . .	<i>Celerio lineata lineata</i> , (Ochs.)	Tobacco Moth.	Larva
<i>Anagrus armatus</i> , Ashm. . .	<i>Saccharosydne sacchivora</i> , (Westw.)	W. I. Cane	Egg
<i>Chelonus insularis</i> , Cress. . .	<i>Laphygma frugiperda</i> , Sm. & Abb.	Fall Army Worm.	Larva.
<i>Opius anastrephæ</i> , Vier. . .	<i>Anastrepha fraterculus</i> , (Wied.)	Mango Fruit Fly	Larva
<i>Evania appendigaster</i> , L. . .	<i>Periplaneta americana</i> , L.	Cockroach.	Eggs
<i>Tetrastichus periplanetæ</i> , Crawf. . .	<i>Periplaneta americana</i> , L.	Cockroach	Eggs.
<i>Arrhenophagus chionaspidis</i> , Auriv. . .	<i>Saissetia nigra</i> , (Neitn.)	Black Scale.	
<i>Aplastomorpha calandraræ</i> , (How.) . .	<i>Calandra oryza</i> , L.	Rice Weevil	
<i>Zagrammosoma multilineata</i> , (Ashm.) . .	<i>Leucoptera coffeella</i> , Staint.	Coffee Leaf Miner	Larva
<i>Pentarthrum minutum</i> , (Riley). . .	<i>Diatraea saccharalis</i> , F.	Sugar Cane Moth Borer.	Eggs.
<i>Lecanobius cockerelli</i> , Ashm. . .	<i>Saissetia hemisphaerica</i> , (Targ.)	Hemispherical Scale	
Do. . . do. . .	<i>Pseudoparlatoria ostreata</i> , Ckll.	Acalypha Scale.	

5. Mosquitoes and Chara.—Experiments with Chara were carried out with a view to finding out whether or not the indigenous species of this water plant were of any practical value in restricting or preventing the extensive breeding of mosquitoes.

Two species of Chara (Nos. 1 and 2) were procured from Bull Head and placed in a receptacle containing water, but, two days after this was done and before an opportunity arose for obtaining mosquito larvae to put into the receptacles, the water in both receptacles was found to be teeming with larvae of the yellow fever mosquito, *Aedes argenteus*, Poir. So, these two indigenous species of Chara, at least, do not restrict the breeding of one species, at least, of mosquito.

6. Tours.—Sixteen visits were made into the country; ten for investigation purposes, two to deliver lectures on the Banana Borer, and four to start or inspect demonstration plots in connection with the control of the Banana Borer.

7. Publications.—The following publications were issued during the year:

Circular 10—Citrus Cultivation.

“ 11—The Sweet Potato Weevil.

Bulletin 3—The “White Flies” (*Aleyrodidae*) of Jamaica.

“Insect Friends and Foes,” published in the Journal of the Jamaica Agricultural Society.

8. Insect Collection.—A large amount of material, including several new species, has been added to the Collection during the year. I devoted part of my local leave at Cinchona in obtaining insects for the Collection.

I would like to acknowledge my indebtedness to Mr. H. H. Cousins, Director of Agriculture, and Mr. J. E. E. Armstrong, Agricultural Instructor, Trelawny, for entomological specimens; to Dr. Guy A. K. Marshall, C.M.G., Director of the Imperial Bureau of Entomology, Dr. L. O. Howard, Chief of the U.S. Bureau of Entomology, Messrs. H. L. Viereck and C. H. Curran, of the Entomological Department, Canada, for the identifications of insects, which, owing to a poorly equipped library, it is not possible for me to undertake.

C. C. GOWDEY, B.Sc., F.E.S.
Government Entomologist.

REPORT OF THE MICROBIOLOGIST.

In January I was appointed one of the Joint Secretaries of the Ninth West Indian Agricultural Conference, held in Kingston, Jan. 28—Feb. 2nd., 1924. A report on this Conference is given elsewhere, and the full proceedings will appear shortly, being now in course of publication.

I was absent from the Island for the months of June, July and August, having been given leave of absence to attend the Imperial Mycological Conference and the Imperial Botanical Conference in London. The agenda of the former included:—

1. The Activities and Organisation of the Imperial Bureau of Mycology.
2. The publications of the Bureau.
3. Co-ordination of investigations on Fungicides.
4. Plant Disease surveys in the British Empire.
5. Standardisation of nomenclature in Plant Pathology.
6. Encouragement of industrial enterprise in investigations of plant diseases.
7. Diseases of plantation crops.

Under this head the Panama Disease of Bananas was fully discussed, and I gave a short account of my experiments with the organism causing the disease and its close allies.

8. The influence of soil conditions on Plant Diseases.
9. The application of the results of mycological research.

At the Imperial Botanical Conference the following items of interest to Plant Pathologists were discussed:—

1. Diseases of Cloves in Zanzibar.
2. Citrus Exanthema in Western Australia.
3. Spike Disease of Sandal.
4. Studies in the genus *Fusarium*.
5. The relation of Plant Pathology to Silviculture.
6. Relation of Plant Pathology to Genetics.
7. Sugar Cane Mosaic.

Prof. Ashby from Trinidad opened the discussion, and afterwards I gave a short resume of the disease in Jamaica and the history of our attempts to eradicate it.

A paper by Mr. Storey on the Streak Disease of the Uba Cane in Natal was also read.

8. *Budrot of Coconut*.—All speakers on this subject agreed that the term includes a number of distinct diseases, all of which finally end in the rotting of the bud of the tree.

While in London, I also attended a Conference called by the Ministry of Agriculture to discuss the question of International Legislation with regard to Plant Diseases.

Plant Diseases in Jamaica during 1924.—The samples of Plant Diseases examined during the year were 154 in number, collected as follows:—

Officers of the Dept. of Agriculture	..	24
Officers of the Jamaica Agricultural Society	..	29
Private persons	..	37
Collected by the Microbiologist	..	64

The diseases are dealt with below under their host plants:—

Bananas.—*Panama Disease*.—The official returns of cases treated during the year are given under the report of the Advisory Committee on the Banana Industry. During the year a pamphlet was published dealing with the disease and the various Laws and Orders relating to its treatment in Jamaica.

A large series of inoculation experiments on this disease was commenced at the Laboratory during the latter part of 1923, and has been carried on during the present year. The plants were grown in small barrels, which proved to be rather unsatisfactory, as the capacity of the barrels was not sufficient to allow of normal growth of the plants, which in consequence remained stunted. Great difficulty was experienced in keeping the plants alive during the prolonged drought at the beginning of the year, and several succumbed during my absence on leave in the summer.

Several of the plants inoculated during 1923, and in the beginning of the present year have succumbed to the disease, but the progress of the disease in the inoculated plants appears to have been greatly retarded by the conditions under which the plants have been growing, such as lack of root space and prolonged drought. None of the plants showed any symptoms of the disease when I left to proceed on leave in June, though some had been inoculated as far back as October, 1923. After my return in September, the drought had broken, and shortly afterwards several plants began to show symptoms of the disease. The plants remaining healthy at present will be kept for another two or three months to see whether any more will develop the disease.

One set of these inoculations was used for purposes of diagnosis of the various strains of *Fusarium* among my collection of cultures. All the evidence I have obtained up to the present tends to show that the strain of *Fusarium* responsible for the Panama Disease is restricted in distribution to the tissues of diseased plants and to the soil around their base. I have not succeeded in isolating any strain of *Fusarium* pathogenic to the banana from any other situation.

Another phase of the work on the Panama Disease is the raising of seedling bananas for trials of resistance to the disease. Work was started during the year on attempting to obtain seedlings from various cross-pollinated bananas at the Experiment Station. A large number of pollinations have been carried out on the several varieties of bananas collected there by Inspector Sutherland. Advice was given as to the method of pollination, and the crosses to be made. This work will be carried on during the coming year. So far none of the pollinated fruit is sufficiently ripe to be searched for seed.

In June, 1923, a number of plants of the China Banana (*Musa cavendishii*, Lamb.) were inoculated with the Panama Disease organism, and up to the present they have shown no symptoms of the disease. Several of them have fruited. This variety appears to be immune to the disease in Jamaica.

Other Banana Diseases.—Specimens of "Black Spot" disease (*Cercospora musarum*, Ashby) were received during the year. Other specimens of banana leaves received from Trelawny were affected with a leaf-spot distinct from the above. From these leaves various fungi and Actinomycetes were isolated, including spp. of *Alternaria*, *Colletotrichum* and *Spondylocadium*. With the three latter two series of inoculations were carried out, one on banana leaves brought into the laboratory, and another on young banana leaves growing outside. None of these inoculations was successful, even when the tissues of the leaves were wounded with a needle before inoculation. It is thus apparent that these fungi are either purely saprophytic in habit, or are capable of attacking the leaves only under certain climatic conditions which are not satisfied here at the Laboratory. The disease has only been found in a single locality, where it appears to be seasonal in occurrence. It is of no economic importance.

Specimens of "Heart Leaf Rot" were examined during the year, but no organism has as yet been isolated and found capable of causing the symptoms of the disease on inoculation into healthy plants. "Bonnygate Disease" (*Sphaerostilbe musarum*, Ashby) is to be found in certain districts, and *Thielaviopsis* and *Marasminius* rots of the "bulb" of banana plants are occasionally reported.

Sugar Cane.—**Mosaic Disease.**—The campaign of eradication of this disease has been carried on during the year under the supervision of the Superintendent of Agriculture.

Experiments on the insect vector of the disease were delayed owing to my absence in the summer, but have been commenced since my return; the preliminary experiments with *Aphis maidis* have given only negative results. It is thought that some condition was operating to prevent the migration of the insect from one plant to another in the cages. Further experiments are in progress. Recently the Elephant Grass — (*Pennisetum purpureum*) has become strongly suspected of being susceptible to the disease, but until exhaustive artificial inoculations have been carried out it cannot be proved. In the field, symptoms have been seen on some plants, which are identical in appearance with the symptoms of Mosaic Disease on other crops, but on the grass the mottling disappears in the older leaves.

In view of the occurrence of a disease of the Mosaic type on the Uba Cane in Natal, many samples of leaf markings and discolourations on that cane have been received recently, but nothing corresponding to the description of the "Streak" disease has yet been found in Jamaica.

Other Cane Diseases.—Various leafspot diseases were observed during the year, but are of no economic importance. On some of the dryer estates the root disease due to *Rhizoctonia* gave some trouble, especially during the prolonged drought.

Coconut.—As a consequence of correspondence from the Jamaica Agricultural Society I visited the parishes of Trelawny and Hanover during October. I found several isolated cases of Budrot, but no signs of any epidemic disease. In several instances the disease had followed on injury to the crown of the tree. In Trelawny I was informed that a disease is present in several districts, evidenced by a gradual withering and yellowing of the leaves of the crown, commencing from the outside, and proceeding inwards until the crown is much reduced in size. This is accompanied by a dropping of the young nuts, and the crop is much reduced. The progress of this trouble is very gradual, and in some instances appears to be due to the effects of the prolonged drought and to unsuitable soil. Specimens of the diseased trees were requested, but have not yet been received at the laboratory.

The Budrot disease continues to occur as isolated cases in several parishes, but no signs of a recurrence of the epidemic of 1916-1918 are apparent.

In St. Thomas several cases of the Leaf Bitten Disease were found, caused by *Thielaviopsis paradoxa* (de Seyn) v. Hohn. A case of a similar disease caused by a species of *Phytophthora* was found in Hanover during my visit there.

Thielaviopsis has been found on several estates causing a rot of the stem of the tree. It is often found to have entered at a wound in the hard outer tissues of the stem, and to have caused a rot of considerable extent in the inner and softer tissues. In other cases it has been found to have entered through small cracks in the outer tissues. The treatment recommended was excision of the affected parts, and a coating of tar or other similar protective material. Most of the wounds on the trees examined were caused by the careless use of the cutlass on the trees, and could be easily avoided.

Cocoa.—Podrot and Canker caused by *Phytophthora Faberi*, Maub., are quite common. Spraying owing to the present market conditions, is not profitable as a means of control, and cultural methods aiming at reduction of shade and humidity without injury to the trees must be employed instead.

Citrus.—Under present conditions the industry is unable to spend money on the control of the various diseases which attack the trees. The fruit is hardly marketable, and is chiefly used for the extraction of the oil. The trees in Manchester are in a deplorable condition and badly need cleaning from the mosses, lichens and epiphytes with which they have been allowed to be covered. In one district, cases of the Withertip of Limes caused by *Gleosporium limeticolum*, Claussen, were found. Citrus Scab due to *Sporotrichum citri*, Doidge, has been noted from St. Ann and from Manchester.

Tobacco.—Specimens were received affected with a rot of the basal portion of the stem caused by a species of *Phytophthora*. The fungus was not found on any other part of the plants. Other plants have been found affected in a similar way by a *Rhizoctonia*.

Truck Crops.—**Potatoes.** *Phytophthora blight* is quite common on the winter crops raised in the hills, where the lower temperature favours the development of the disease. *Alternaria solani* (Early Blight) has been noted during the year. Potato Scab caused by *Actinomyces scabies* is very common on this crop throughout the island, but the damage to the crop is not important as the tubers are easily sold in the markets. The island remains free from invasion by the dreaded Wart Disease (*Synchytrium endobioticum*).

Tomatoes.—A circular dealing with the common diseases of this crop was published during the year. The leaf mould fungus *Cladosporium fulvum* does much damage.

Grapes.—During the recent wet weather the vines in St. Andrew have been noticed to be attacked very severely by *Plasmopara viticola*, the Downy Mildew, which in some cases almost completely defoliated the vines. Other fungi noted during the year were *Physopella vitis*, *Uncinula necator* and *Gleosporium ampelophagum*.

A number of plants were sent in suspected of being infected with Mosaic Diseases. These included various species of *Malvastrum*, *M. spicatum*, *M. Coromandelianum*, and *M. tricuspidatum*; also various Leguminosæ, including several kinds of beans. Experiments are being carried out with these plants to determine whether the appearance is a true Mosaic Disease and transmissible from plant to plant. In the case of the Bush Bean, *Phaseolus vulgaris nanus* seed taken from plants showing the mottled appearance did not transmit the appearance to the offspring in the experiments conducted.

Publications.—During the year a bulletin was published on the Panama Disease of the Banana and another on Tomato Diseases and Their Control.

A bulletin on the species of *Fusarium* present in Jamaica has been prepared during the year, but certain identifications being carried out in America are necessary to complete the work ready for publication.

Fermentation.—A number of requests were received for pure yeast starters for distillery work on estates, and these were supplied. Several inspections of distilleries were carried out during the year and reports submitted. I regret to state that during my absence on leave in England my cultures of yeast in the Laboratory became contaminated, and have had to be discarded. During the coming sugar season I hope to replace them with healthy strains.

Work has been continued on the collection of specimens and cultures of Jamaica Fungi, especially those in the district around the laboratory. During the prolonged drought this part of the work had to be abandoned.

C. G. HANSFORD, M.A. (Cantab.)
Microbiologist.

VI.—AGRICULTURAL EDUCATION.

REPORT OF HEADMASTER GOVERNMENT FARM SCHOOL.

Students.—The number of Students resident at the School was as follows:—

Easter Term	30
Midsummer Term	32
Christmas Term	30

The following students completed the course and were awarded Certificates:—

T. B. Lecky, Swift River
E. Collins, Walderston
N. S. Gabay, Glengoffe
H. E. Harris, Somerton
E. M. Carey, Glengoffe
A. B. Gray, Hope Bay
B. K. Silvera, Oracabessa
C. H. Whittle, Bath
S. G. Hanson, Cross Roads
O. L. Carnegie, Darliston
M. E. Buckley, Bath
E. E. Evans, Kingston
G. N. Roche, Gayle
E. A. Dunbar, Bybrook.

It will be seen from the above that the School has Students from all parts of the Island.

It is gratifying to record that eight of the students had obtained positions on Estates by the first week in January and two others are on their fathers' plantations.

Curriculum.—The usual course was carried out.

Staff.—Mr. A. F. Thelwell returned to the school in April. Mr. Tavares acted as Veterinary Instructor for the year.

General.—The students carried out a very successful exhibition of the animals before the West Indian Agricultural Conference in January.

The general condition as to lighting and sanitation remains the same as in my last report.

The students rendered valuable aid in the working of the Stock Farm and the Experimental Station.

R. S. MARTINEZ,
Headmaster.

REPORT OF MEDICAL OFFICER.

Sir,

I have the honour to report that the general health of the students of the Hope Farm School for the year ending 31st December, 1924, has been good.

All the students were vaccinated against Small Pox and inoculated against Enteric Fever.

The sanitary conditions are on the whole good, but the bucket system should be replaced by W.Cs. and absorption pits.

The bucket system is potentially dangerous especially on premises on which a dairy is situated.

LEWIS A. CROOKS,
M.B., C.M. (Edin.)

REPORT OF ACTING VETERINARY SURGEON.

I lectured to the students of the Farm School for one hour three times a week on Veterinary Science including the following subjects:—

Care of animals in health and disease, Hygiene, Anatomy, Physiology, Pathology, Shoeing, Pharmacy, Therapeutics, Theory and Practice of Medicine and Surgery, and also gave demonstrations on the living animals.

The students were divided into three classes, first, second and third year, and the Veterinary subjects taught were graded according to class.

I was only called upon to render professional services of a trivial nature to the animals of the Stock Farm, not worthy of mention.

I was, however, called upon to investigate outbreaks of diseases in different parts of the Island, as follows:—

January 9th. Visited Troja district of St. Mary. Reported outbreak of disease among hogs. Made two post mortems. Diagnosis, virulent form of Swine Fever (Hog Cholera), could not gain information as to source of infection. District placed under quarantine.

January 11th. Visited Saint Andrew with further reference to Swine Fever and the special instance of immunity from the disease among hogs on a property in the infected area.

This property is on the Old Pound Road, away from infected places. The proprietor informed me that no strangers, not even dogs are permitted near his hog pen. To amplify on this subject I quote from Bulletin Hog Cholera, U.S. Department of Agriculture by Mohlar, 1921.

"It has been demonstrated that susceptible hogs may be kept within a few feet of cholera hogs without becoming infected if sufficient care is taken to prevent the infection from being carried from the sick to the healthy animal. On the other hand it has been noticed in practice that at times herds on farms immediately adjoining outbreaks of cholera may escape the disease while farms several miles away become infected. It is probable that the ways in which cholera spreads are not yet fully understood."

January 14th. Visited Gordon Town. Reported case of Swine Fever (Hog Cholera). Diagnosis: acute diarrhoea in a hog due to sudden change of diet. Other hogs on premises not affected.

January 17th. Visited Manchioneal. Supposed outbreak of infectious disease among cattle with several deaths. After careful examination of the property and the remaining cattle, I concluded that the animals died from mal-nutrition due to lack of food and did not suffer from any specific disease.

February 5th. Visited premises in Kingston to investigate a supposed outbreak of infectious cattle disease. On inspection I found a cow and a calf in an emaciated and debilitated condition dying of starvation.

February 20th. Visited Albany district of St. Mary. Reported outbreak of disease among hogs. By instructions from the Department, I was met by Mr. Carpenter, the Inspector of Plant Disease. He showed me around three districts, viz., Islington, Rosedale and Friendship. At the latter place I was informed that the mortality had been considerable, a large proportion of the peasantry having lost all their pigs, deaths often occurring within 24 hours of illness. We could not locate any sick pigs, but from the symptoms described—great body heat, debility and paralysis of the hind quarters—I concluded that deaths were due to Swine Fever (Hog Cholera). The severity of the type (short duration of illness) was also typical of the Troja outbreak. I therefore questioned if hogs had been brought from outside districts, but the replies were all in the negative.

April 1st. Visited St. Catherine. Reported outbreak of Foot and Mouth Disease in cattle. Diagnosis: severe form of Mycotic Stomatitis in a steer. By instructions from the Department, the property was placed under provisional quarantine for 10 days, and all the animals inspected by me.

May 12th. Visited a property in St. Catherine. Reported case of Foot and Mouth Disease in a cow. Diagnosis: Mycotic Stomatitis.

June 21st. Visited an estate near Morant Bay. Reported outbreak of disease and deaths among cattle. Made post mortem on carcass of a cow. Diagnosis: Anthrax. Property placed under quarantine.

September 25th. Visited a pen in the parish of Manchester. Reported infectious disease among cattle with many deaths. I was shown the carcass of two cows on which I made autopsy. No. 1 satisfied me that the cause of death was due to debility and emaciation—animal was very thin; the internal organs were undergoing putrefactive changes. I was therefore unable to arrive at the cause of death. The second animal was in good condition.

November 18th. Visited Port Antonio to investigate reported outbreak of disease among hogs at Moore Town. By instruction from the Department I was met by Mr. Brown, the Plant Disease Inspector and in company with him started for Moore Town, but owing to continued rains which had fallen all the previous night we were unable to reach our destination. Landslides and a swollen river were also encountered.

Animals imported:

January 15th. One dog—England.

January 15th. Horse—British Honduras. This horse was landed by error on my part and also of the Police and Customs Departments. The animal however, was immediately quarantined by order of the Department.

January 29th. One dog—England.

March 24th. One dog—England.

November 19th. One horse—New York, U.S.A. This animal was accompanied by a Mallein Test for Glanders.

E. TAVARES,
Acting Veterinary Consultant.

VII.—LIVESTOCK.

A. GOVERNMENT STUD FARM, GROVE PLACE, MANCHESTER.

LIVE STOCK, GROVE PLACE PEN, 1924.

	1 Zebu Jersey Bull.
	1 Ayrshire Bull
	1 Hereford Bull
	1 Devon Bull
	1 Grade Angus Bull
	3 Bull Calves of 1923.
34	26 Bull Calves of 1924
	186 Native Dairy Cows
220	34 Draft Cows
	7 Pedigree Heifers
	11 Native Heifers
	12 Grade Holstein Heifers
	2 Grade Hissar Heifers
	33 Grade Ayrshire Heifers
	19 Grade Guernsey Heifers
	23 Grade Jersey Heifers
	4 Grade Montgomery Heifers
	23 Grade Red Poll Heifers
	20 Grade Swiss Heifers
160	6 Grade Zebu Jersey Heifers
8	8 Plough Steers
422	
	<i>Horsekind—</i>
	1 Imported Proof Ass "Kentucky Boy"
	12 Brood Mares
	5 Fillies
	1 Colt
	3 Geldings
	12 Mules
	3 Donkeys
	37 Head.

The following is the Summary of the Valuation of the Live Stock at Grove Place on December 31st, 1924:—

			£	s.	d.
Cattle	..	..	3,442	10	0
Horsekind	..	..	865	0	0
		Total Pen Stock	4,307	10	0
Beef Cattle		..	1,310	0	0
Indian Cattle	..	..	1,180	0	0
		Grand Total	6,797	10	0

SERVICES OF BULLS AT GROVE PLACE, JANY. 1ST—DECEMBER 31ST, 1924.

Bulls.	Visiting Cows.	Farm Cows.	Total.
Hereford "Peacemaker"	..	2	2
Sussex "The Arab"	..	1	1
Devon "Rentpayer"	..	2	5
Brown Swiss "Trumpeter"	..	15	20
Jersey "Hector"	..	29	59
Jersey "Hon. Mr. Polo"	..	4	7
Guernsey "Coley's May King"	..	4	16
Guernsey "Liza's 1st Plato"	..	..	7
Red Poll "Pilot of Hope"	..	5	1
Montgomery "Dairyman"	..	1	2
Hissar "Pride of the Punjab"	..	..	7
Ayrshire "Cyril"	..	1	2
Ayrshire "Food Controller"	..	5	3
Ayrshire "Rubicon"	..	..	1
Holstein "Sir Pauline Homestead"	..	6	5
			11
Total		73	86
			159

LIST OF WINNERS BY "WATER JACKET."

Names.	No. of Races won.
White Rock	9
Water Lily	8
Long Town	9
Rain Cloud	12
Water Willow	1
Water Maid	4
Water Mark	8
May Be	10
Boisscau	2
Miss Cuttle	4
Maud McIntosh	1
Wild Life	9
Marne	6
Chancellor	3
Water Rate	4
Water Waistcoat	2
Day Break	5
Straight Jacket	1
Copper Jacket	2
Regatta	1
Sunflower	2
Eclipse	1
Waterman	12
Sealed Orders	5
Barbary	2
Sunburst	10
Beauty	1
Water Rock	19
Gunga Din	3
Leander	2
Shrapnel	2
Total	160

B. GOVERNMENT STOCK FARM, HOPE.

Live Stock "Hope Stock Farm," 1924.

	1 Imported Red Poll Bull
	2 Native Red Poll Bulls
	5 Imported Red Poll Cows
42	34 Native Red Poll Cows and Heifers
	2 Imported Jersey Bulls
	5 Native Jersey Bulls
	3 Imported Jersey Cows
39	29 Native Jersey Cows and Heifers
	5 Native Guernsey Bulls
	2 Imported Guernsey Cows
10	3 Native Guernsey Cows and Heifers
	1 Imported Ayrshire Bull
	3 Native Ayrshire Bulls
	2 Imported Ayrshire Cows
9	3 Native Ayrshire Cows and Heifers
7	7 Native Brown Swiss Cows
2	2 Beef Bulls
1	1 Beef Heifer
110	
	11 Grade Montgomery Bulls
	1 Grade Nellore Bull
13	1 Grade Jersey Bull
	102 Dairy Cows
	15 Draft Cows
	12 Foster Mother Cows
	7 Native Heifers
	2 Grade Ayrshire Heifers
	7 Grade Guernsey Heifers
	11 Grade Holstein Heifers
	33 Grade Jersey heifers
	21 Grade Montgomery Heifers
	7 Grade Nellore Heifers
	1 Grade Hissar Heifer
	5 Grade Red Poll Heifers
226	3 Grade Swiss Heifers
	14 Plough Steers

Horsekind—
 10 mules
Poultry—
 2 Pens Indian Games and Rhode Island Reds
Bees—
 10 Hives

WEEKLY ANALYSIS OF MILK SUPPLIED TO THE PUBLIC HOSPITAL AND LUNATIC ASYLUM BY THE STOCK FARM, 1924.

Quarter ending	Solids.	Fat.	Sp. Gravity.	Solids not Fat.
March 31, 1924	12.47	4.36	1.0283	8.11
June 30, 1924	12.10	3.93	1.0289	8.17
September 30, 1924	12.55	4.32	1.0289	8.23
December 31, 1924	12.89	4.69	1.0284	8.20
	12.50	4.33	1.0286	8.17

The following is a summary of the valuation of the Live Stock at the Farm in December, 1924:—

Cattle ..	..	..	..	£7,826
Horsekind ..	..	..	..	186
Poultry ..	..	..	..	42
Bees ..	..	..	..	9
				8,063

MILK YIELD, DAIRY HERD 1920, 1921, 1922, 1923, 1924.

Imperial Quarts per diem.

Month.	1920.	1921.	1922.	1923.	1924.
January ..	279.8	199.1	283.5	348.4	264.4
February ..	299.8	291.2	264.5	347.2	238.2
March ..	245.1	338.8	294.9	307.6	249.3
April ..	239.6	338.5	259.6	248.9	224.2
May ..	194.5	309.3	300.1	318.7	271.4
June ..	190.2	304.0	289.8	369.3	337.8
July ..	194.7	299.0	304.3	324.6	376.1
August ..	186.5	288.7	310.5	303.0	356.0
September ..	207.1	332.8	314.4	320.6	365.6
October ..	250.7	287.8	270.8	270.3	370.4
November ..	286.8	263.5	296.3	286.8	326.3
December ..	230.6	269.4	298.0	288.5	314.6
Average	233.8	293.5	290.5	314.2	307.9

RECORD OF DAIRY HERD MILK YIELD, 1924.

Month.	Av. No. of Cows.	Total qts. per mensem.	Av. per Cow qts.
January ..	67	8,197.1	4.0
February ..	63	6,908.2	3.8
March ..	64	7,729.0	3.9
April ..	62	6,727.3	3.6
May ..	63	8,413.8	4.3
June ..	69	10,134.1	4.9
July ..	73	11,658.2	5.1
August ..	73	11,036.0	4.9
September ..	79	10,966.8	4.6
October ..	82	11,482.8	4.5
November ..	78	9,789.7	4.2
December ..	75	9,752.6	4.2
	71	112,795.6	4.3

MILK YIELD, 1924, HOPE DAIRY HERD.

Order.	Cow.	Breed.	Age in years.	Average Con. Milk Fat	Lbs. of Milk.	Milking weight Lbs.	Max. milk yield Imp. qrts	Sale value at 8d. per qrt.
1	Norbrook 2nd (9 mths.)	Grade Holstein	5	3.7	10,421*	1,048	19.4	£ 134 s. 1 d. 7
2	Polka Dc ^t	Red Poll	6	4.4	4,621	1,200	11.2	59 9 5
3	Fifi	Grade Jersey	9	4.0	4,547	830	9.7	58 10 1
4	Lady Greta	Red Poll	7	3.9	4,456	1,200	11.1	57 6 5
5	Lydite	Grade Hostein	13	3.8	4,326	940	8.8	55 13 3
6	Sola 5th	Grade Zebu-Jersey	5	3.3	4,285	988	11.3	55 2 8
7	Foxy 1st	Zebu-Jersey	7	4.5	4,113	854	7.3	52 18 4
8	Hope Pansy	Jersey	8	4.1	4,087	774	7.3	52 11 6
9	Fanny 2nd	Zebu-Jersey	6	4.0	4,047	850	9.3	52 1 7
10	Badge 2nd	do	6	4.9	4,017	720	9.8	51 13 9
11	Hope Flighty	Red Poll	6	3.9	3,843	860	12.8	49 8 9
12	Norbrook	Native	10	4.4	3,802	1,200	10.4	48 18 6
13	Hector's Janestine	Jersey	4	5.3	3,795	760	9.4	48 16 6
14	Hope Brisk 1st	Red Poll	5	4.3	3,748	866	7.8	48 4 4
15	Bunny	Grade Holstein	8	4.0	3,666	1,000	9.4	47 3 4
16	Pansy	Jersey	14	4.4	3,632	820	7.4	46 14 6
17	Pussy	Grade Red Poll	9	3.8	3,630	800	9.6	46 14 1
18	Purity	Red Poll	10	3.7	3,618	1,212	11.6	46 10 11
19	Pobess	Grade Red Poll	10	3.9	3,604	1,052	9.7	46 7 5
20	Sola 2nd	Grade Zebu-Jersey	8	4.0	3,591	1,178	11.7	46 4 3
21	Diva 2nd	do	9	5.1	3,579	906	8.9	46 0 9
22	Diva 4th	do	7	4.3	3,550	996	9.0	45 13 5
23	Shrew 2nd	Zebu-Jersey	9	4.9	3,543	1,172	8.2	45 11 10
24	Carmen	Grade Guernsey	10	4.3	3,541	874	11.2	45 11 1
25	Blossom 1st	Grade Zebu-Jersey	6	4.4	3,537	870	11.3	45 10 3
26	Larva	Zebu-Jersey	9	4.4	3,504	850	8.1	45 1 5
27	Buz	Holstein-Red Poll	5	3.5	3,469	784	8.5	44 12 7
28	Timorette	Zebu-Jersey	9	5.1	3,466	824	7.8	44 11 7
29	Etta of Hope	Jersey	4	4.0	3,464	740	11.0	44 11 2
30	Violet 2nd	Grade Zebu-Jersey	7	4.1	3,427	960	12.5	44 1 8
31	Dodo 1st	Grade Holstein	5	3.8	3,367	1,118	15.9	43 6 7
32	Quail 2nd	Zebu-Jersey	7	4.6	3,343	825	4.7	43 0 4
33	Hope Sprightly	Red Poll	5	4.4	3,315	850	8.0	42 13 0
34	Flora	Guernsey	4	4.2	3,295	750	8.3	42 7 10
35	Honeybelle	Jersey	14	4.7	3,252	850	5.9	41 17 0
36	Dolly	Zebu-Jersey	10	4.8	3,246	1,080	10.6	41 15 1
37	Bess 1st	Grade Guernsey	4	4.9	3,226	850	8.1	41 10 0
38	Fanny 3rd	do	4	4.7	3,217	742	9.4	41 7 8
39	Hector's Pansy	Jersey	6	4.5	3,202	930	6.6	41 3 10
40	Diva	Grade Guernsey	13	4.3	3,163	770	7.5	40 13 7
41	Monica 1st	Grade Zebu-Jersey	9	4.3	3,140	920	10.1	40 7 7
42	Monica 12th	Grade Guernsey	4	4.6	3,123	700	8.3	40 3 5
43	Pet 1st	Grade Zebu-Jersey	5	4.7	3,120	790	8.2	40 2 8
44	Tilda	Grade Red Poll	11	3.6	3,083	1,220	7.2	39 13 6
45	Melinite	Grade Zebu-Jersey	7	4.1	3,066	800	5.6	39 8 11
46	Ada 1st	Grade Jersey	4	5.2	3,056	620	7.5	39 6 5
47	Blossom 2nd	Grade Holstein	4	3.6	3,048	648	6.2	39 4 7
48	Brown Blossom	Ayrshire	8	4.2	3,040	990	9.0	39 2 4
49	Monica 3rd	Grade Zebu-Jersey	7	4.2	3,021	740	9.1	38 17 1
50	Hope Betty 2nd	Red Poll	7	4.7	3,006	945	8.3	38 13 5
51	Beta	do	13	3.9	2,905	850	8.0	37 7 9
52	Shrew 11th	Grade Guernsey	5	4.7	2,858	800	9.5	36 15 6
53	Desiree 1st	Red Poll	8	4.0	2,838	808	5.6	36 10 2
54	Ruby	Ayrshire	10	3.6	2,808	956	11.0	36 2 8
55	Baby 1st	Grade Jersey	6	4.0	2,789	830	8.8	35 17 8
56	Hope Pansy 1st	Jersey	4	5.1	2,778	784	5.4	35 14 10
57	Red Girl 2nd	Grade Zebu-Jersey	5	4.5	2,764	670	7.7	35 11 2
58	Kara 1st (in 3½ mths.)	Grade Hostein	4	3.6	2,678	970	20.0	34 9 0
59	Monica 2nd	Grade Zebu-Jersey	8	4.3	2,650	1,040	5.4	34 1 8
60	Lydite 11th	do do	7	4.1	2,589	875	7.8	33 5 11
61	Sunflower	Guernsey	11	4.4	2,584	960	8.9	33 4 11
62	Hope Beta 2nd	Red Poll	6	4.0	2,559	830	7.6	32 18 2
63	Hope Bee 1st	do	4	4.8	2,553	954	7.7	32 16 7
64	Cora	Guernsey	4	4.8	2,450	800	6.8	31 10 3
65	Casilda 2nd	Grade Zebu-Jersey	6	4.4	2,441	990	5.8	31 7 10
66	Monica 11th	Grade Guernsey	5	3.3	2,429	876	7.9	31 4 8
67	Lizzie	Grade Jersey	13	3.3	2,417	1,000	8.6	31 1 11
68	Ruby 21st	Ayrshire	4	3.0	2,194	926	6.6	28 4 4

* "Norbrook II" gave 12,305 lbs. Milk and 455 lbs. Butter Fat in 365 days. Sale Value £158 6s. 6d.

PROGRESS RECORD.

			Increase.			Decrease.		
			£	s.	d.	£	s.	d.
Improvement in year's work		1916-1917	825	3	7			
"	"	1917-1918	995	1	6			
"	"	1918-1919	584	7	5			
"	"	1919-1920	3,093	6	11			
"	"	1920-1921	588	9	5			
"	"	1921-1922	795	17	10			
"	"	1922-1923	972	10	1			
Decrease	"	1923-1924				1,567	3	8
Improvement	"	1924-1925	359	3	9			
Average net increase for nine years.			738	10	9			

REVENUE.				EXPENDITURE.			
	£	s.	d.		£	s.	d.
Milk Sales ..	3,690	11	2	Wages—			
Rents ..	74	2	11	Dairymen ..	310	12	1
Stock Sales ..	791	13	4	Students' Work ..	37	15	8
Poultry Sales ..	27	14	9	Cartmen ..	159	2	10
Rearing Calves ..	29	8	0	Ranger ..	19	2	0
Feed Sales ..	27	18	7	Moving Stock ..	12	16	8
Pasturage ..	120	0	0	Bonus and Rewards ..	19	4	0
Miscellaneous ..	189	0	7	Clipping Cows ..	9	15	9
				General ..	79	14	4
			4,950 9 4				648 3 4
				<i>Food for Stock—</i>			
				Purchased Guango			
				40 Met			
				tons	£68	10	0
				" Powdered			
				Milk 2			
				Met. tons	68	14	8
				Cotton			
				Seed			
				meal 57.5			
				Met. tons	745	7	10
				" Oil Meal			
				12.5 Met.			
				tons ..	183	0	2
				" Native Hay			
				1 Met. ton	7	5	3
				" Bran 5			
				Met. tons	48	5	9
				" Oats 23.5			
				Met. tons	227	2	8
					1,348	6	4
				Cutting and Carting Forage			
				Canes, 952 Met. tons ..	52	16	2
				Cutting and Carting grass ..	84	4	2
				Harvesting and Manufac-			
				turing Silage (Guinea			
				Corn,) 438 Met. Tons	211	9	0
							1,696 15 8
				<i>Growing Crops—</i>			
				Pines, 2 acres	£72	14	10
				Guinea Corn 82 "	130	19	4
				Canes 11 "	66	3	11
					269	18	1
				Grass Kintyre			
				55 acres	107	14	0
				Grass, Mango			
				Walk 12 acres	8	12	0
				Elephant Grass	3	12	6
					119	18	6
							389 16 7
				<i>Repairs to Machinery and Equipment</i>			507 11 8
				Foreman ..			165 0 0
				<i>Cleaning—</i>			
				Mango Walk, 150			
				acres	£58	7	10
				Blue Castle, 39			
				acres	6	9	9
				Kintyre, 100 acres	46	6	2
				King's House			
				Pastures	62	15	5
				Ja. College new			
				lands	11	18	3
				Bull Pen	7	14	0
					193	11	5
				<i>Fencing—</i>			
				Mango Walk, 57			
				chns. new, 800			
				repairs	£42	18	7
				Blue Castle, 250			
				repairs	24	3	11
				Kintyre, 240			
				repairs	12	14	1
				Yard	13	0	2
				General	24	8	0
					117	4	9
				<i>Repairs and Maintenance of</i>			
				Roads and Yards	40	10	5
							351 6 7
				<i>Rearing Calves</i>			386 8 0
				<i>Purchase of Stock</i>			152 0 0
				<i>Miscellaneous</i>			278 7 10
				Excess Revenue over Expenditure			374 19 8
			4,950 9 4				4,950 9 4

GOVERNMENT STOCK FARM AT HOPE, BALANCE SHEET (PROVISIONAL) 31st MARCH, 1925.

[illegible]

VIII.—GOVERNMENT LABORATORY.

REPORT OF DEPUTY ISLAND CHEMIST.

The total number of samples dealt with was 1,794, as compared with 1,809 and 1,497 in the two previous years, being 15 samples less than the record of 1,809 established last year.

The samples may be classified as under:—

"A." OFFICIAL.

(1.) <i>Police</i> —				
Human viscera and organs	..	..	48	
Vomits	..	..	6	
Substances examined for Poison	..	..	59	
Medicines and Drugs	..	..	21	
Counterfeit Coins	..	..	98	
Counterfeiting Exhibits	..	..	58	
Arson Exhibits	..	..	11	
Ganga	..	..	30	
Miscellaneous	..	..	6	
<i>Under the Drugs and Poisons Law</i> —				
Drugs and Medicines	..	..	8	
<i>Under the Spirit License Law</i> —				
Rums	..	..	1	
<i>Under the Petroleum Laws</i> —				
Gasolines	..	..	2	
Kerosine Oils	..	..	2	
<i>Under the Adulteration of Food and Drugs Law</i> —				
		Genuine	Adulterated	Total.
Fresh Milks	..	9	1	10
Total Police			..	360
(II) <i>Customs</i> —				
Native and other Wines	..	..	81	
Rectified Spirits and Abs. Alcohols	..	..	23	
Industrial Alcohols	..	..	2	
Fuel Oils	..	..	20	
Gasolines	..	..	9	
Disinfectants and Insecticides	..	..	10	
Flavouring Extracts	..	..	8	
Condensed and Dried Milks	..	..	8	
Miscellaneous	..	..	7	
<i>Under Government Sugar Test</i> —				
Sugars	..	..	10	
Total Customs			..	178
(III) <i>Department of Science and Agriculture</i> —				
Feeding Stuffs	..	..	6	
Fuel Oils	..	..	4	
Soaps	..	..	7	
Condensed and Dried Milks	..	..	6	
Miscellaneous	..	..	6	
Total			..	29
(IV) <i>Government Geologist</i> —				
Waters	..	..	4	
Soils, Minerals and Ores	..	..	8	
Crude Oils	..	..	2	
Oil Seepages	..	..	2	
Total			..	16
(V) <i>Public Works Department</i> —				
Gasolines	..	..	2	
Paving Material	..	..	1	
Total			..	3

(VI) *Government Railways—*

Waters	..	..	..	1
Steam Coals	..	..	..	1
Steel Rails	..	..	..	2
Tars	..	..	..	1
Total				5

(VII) *Island Medical Department and Medical Officers of Health—*

Drug	..	..	..	1
Condensed Milk	..	..	..	1
Waters	..	..	..	6
Fresh Milks	..	..	..	2
				10
Total Official Samples				601

"B." AGRICULTURAL.

Soils and Sub-soils	..	..	..	27
Canes and Cane Juices	..	..	..	23
Molasses	..	..	..	14
Artificial Manures	..	..	..	11
Bat Guanos	..	..	..	5
Agricultural Limes	..	..	..	6
Total				76

"C." GENERAL.

Stock Farm Milks	..	..	..	660
Cattle Dips	..	..	..	66
Sugars	..	..	..	152
Rums	..	..	..	70
Waters, Potable	..	..	..	34
" Boiler Feed and Irrigation	..	..	..	17
Fresh Milks (Private)	..	..	..	41
Condensed Milks	..	..	..	3
Animal Viscera for Poison	..	..	..	3
Substances for Poison	..	..	..	8
Minerals and Ores	..	..	..	13
Steam Coals	..	..	..	7
Oils, Fixed	..	..	..	5
" Fuel	..	..	..	4
Medicines and Herbs	..	..	..	3
Food Products	..	..	..	8
Gasolines	..	..	..	3
Miscellaneous	..	..	..	20
Total				1,117
Grand Total				1,794

OFFICIAL SAMPLES.

The 48 analyses of Human Viscera and Organs were made in connection with 27 deaths. In 10 cases poison was found and recovered from the Viscera as follows:—

- (1) 0.96 grains Arsenious Oxide from the organs of a female adult.
- (2) 33.95 grains Oxalic Acid from the organs of a male adult.
- (3) 1.82 grains of Aconitine from the organs of a female adult.
- (4) 0.27 grains of Opium Alkaloids from the viscera of a male adult.
- (5) 2.43 grains Hydrocyanic Acid from the organs of a female adult poisoned by "bitter cassava."
- (6) 1 grain Arsenious Oxide from the viscera of a female infant.
- (7) 49.5 grains Arsenious Oxide from the organs of a male adult.
- (8) 1.11 grains Arsenious Oxide from the viscera of a male adult.
- (9) $\frac{1}{2}$ grains Cocaine from the organs of a female adult.
- (10) 0.81 grains of Nicotine from the viscera of a female adult.

In the substances suspected to contain poison were found:—

- (1) Oxalic Acid $\frac{1}{2}$ 21.50 grains.
- (2) Hydrocyanic Acid from "bitter cassavas."
- (3) Arsenic (Cooper's Dip) case of accidental poisoning of a child.
- (4) Arsenic (Cooper's Dip) case of poisoning of an adult male.
- (5) Arsenic (Arsenite of Soda) administered in food; attempted poisoning of a family.
- (7) Arsenic (Arsenite of Soda) administered in Cane Juice in case of a murder.
- (8) Arsenic (Arsenite of Soda), used in a case of murder.
- (9) Yellow phosphorous 0.012 grains in water; case of attempted poisoning.
- (10) Euphorbiaceae, poisonous bush used in a case of attempted suicide.
- (11) Mercuric Ammonium Chloride, 2.75 grains, used in a case of attempted murder.
- (12) Iodoform, 18 grains, used in a case of attempted poisoning.
- (13) Strychnine, 0.5 grains in beef used for destroying dogs.

The number of analyses of viscera was three times that of last year, whilst the number of articles examined for poison was more than twice that of 1923. The number of Ganga cases investigated was double that of 1923.

Examination of samples submitted by the Police alone almost entirely occupies the whole time of the Deputy Island Chemist, and this is indicative of the increased demands for the services of the Laboratory in the interests of Justice.

The prevalence of crime at the present time is strikingly shown by comparison of the figures for this year with former years.

There has been a great falling off in the number of samples submitted under the Adulteration of Food and Drugs Law, only 25% of the number of samples examined in 1923 being submitted. Greater vigilance on the part of the Police, with whom this Law appears to be a dead letter, is essential to safeguard the public against Adulterated Foods and Drugs.

The Customs submitted 178 samples in the course of the year. The increase in the number of samples of Fuel Oil is noteworthy in view of the increased amount of Fuel Oil consumed by shipping, and the geographical position of the Island as a base and fuelling station. The examinations of Fuel Oil will, no doubt, occupy a more important position in the near future than it has hitherto held.

The analysis of feeding stuffs, including Wynne Grass (*Melinis minutiflora*) and Elephant Grass (*Pennisetum purpureum*), was carried out for the Department of Science and Agriculture.

Experiments were carried out with a view to isolating essential oils from the following plants:—*Anona Muricata* (Sour Sop), *Anona Squamosa* (Sweet Sop), and also *Anona Palustris* (Alligator Apple). No essential oil could be obtained from the first two. The *Anona Palustris* gave a trace of oily distillate which polymerised to a white amorphous substance from which the oil could not be re-obtained. The object of these experiments was to ascertain if products repellant to mosquitoes and other insects could be obtained. Additional experiments along these lines with other Jamaican plants would be of interest and possible benefit to the Island.

Various waters and minerals were analysed for the Government Geologist with special reference to the possible occurrence of petroliferous zones in Jamaica.

In conjunction with the Public Works Department various experiments were carried out with the view of overcoming the excessive absorption of moisture by the Durolithic flooring at King's House. These were negative of result owing to the age of the flooring and the hygroscopic nature of certain of the ingredients in its composition.

AGRICULTURAL.

A large number of soils, sub-soils, manures and irrigation waters were analysed both for the public and also in connection with Manurial experiments with canes. Estate owners are finding that the use of scientific methods are worth while and are preferable to haphazard rule of thumb work. This is shown by the numerous queries which the Laboratory receives and deals with.

GENERAL.

660 samples of milk were analysed for the Government Stock Farm. The standard of quality of milk from this source is well maintained, and the Public Institutions are assured of high grade supply.

The number of sugar samples was about half that of 1923, the decrease being due to a temporary cessation of sugar testing by the Government whilst an investigation was made into methods of testing sugars, and the behaviour of newly cured raw cane sugar on storage. The results obtained proved that the methods used in the Government Laboratory for testing sugars are accurate, and have always been so since the inauguration of sugar analysis in this Department.

Greater interest has recently been displayed concerning Rum. The number of samples examined shows an increase of nearly 30% above the number for 1923. It is evident that the attention of European Merchants has been, once again, drawn to the quality and character of Jamaica Rum at the Wembley Exhibition. It therefore behoves the producers of Jamaican Rum to see that the opportunity for supplying the new demand, which has been created, is not lost. Certain estates send regular samples of rum to the Laboratory for test. There is ample scope for rum distillers to standardise their particular marks by availing themselves of the facilities which exist at the Laboratory for assisting them in the right direction.

The Kingston water supplies were examined each quarter, and the excellent quality of the drinking water is maintained.

Many samples of a miscellaneous character were analysed for private individuals; the samples are of a diverse nature including ores, minerals, food-stuffs, fuels, medicines, herbs, etc.

The Deputy Island Chemist successfully exterminated bats from the inside of the roof of St. Michael's Church, Kingston, by fumigation with hydrocyanic acid gas.

During the year the preparation and sale of Paranaph was continued in addition to supplying Arsenite of Soda for Dipping Tanks. The various substances supplied to the public, together with the amounts, are shown in the appended table.

	1922.	1923.	1924.
Paranaph	27,323	31,689	27,128 lbs.
Arsenite of Soda	16,170	19,442	15,786 "
Copper Sulphate	579	224	307 "
Carbon Bisulphide	463	469	480 "
Ra Poison bulk	174	183	105 "
" 1 oz. packets	245	137	160
Thymol powders	259	507	242 ozs.
Standard Iodine Solution	39,000	45,000	36,200 c.c.

In addition to the above 17 complete Dip Testing Outfits were issued to owners of Registered Dipping Tanks, while numerous small orders were filled for a variety of Chemicals and Apparatus, unobtainable elsewhere, required by various Estates and the general public.

IMPROVEMENTS IN EQUIPMENT FOR THE MANUFACTURE OF PARANAPH.

During the year a large boiler fitted with a mechanical stirring device was installed for the manufacture of Paranaph. The new boiler is capable of turning out 1,600 lbs. of Paranaph per diem as against 320 lbs. turned out by the small boiler hitherto used in which the stirring was done by hand.

The receipts for Laboratory Fees and Sales are shown in the following table, which gives the figures for the past three years.

Amount lodged in Treasury for Calendar Years—

	1922.	1923.	1924.
	£ s. d.	£ s. d.	£ s. d.
Laboratory Fees	65 19 1	209 6 3	159 1 0
Laboratory Sales	1,105 15 6	1,205 9 1	1,038 15 2

The decrease in Laboratory Fees is chiefly due to the fewer number of sugar samples tested.

With regard to Laboratory Sales the number of Dipping Tanks erected in 1924 was less than in 1923, thus decreasing the demand for complete charges of materials. Tanks erected prior to this year merely requiring sufficient supplies to maintain their original strength.

The Condensed Milk experiments have been successful, and it has been demonstrated that milk can travel satisfactorily from any part of the Island, in suitable cans, and be subsequently successfully condensed. A more detailed report on Condensed Milk is submitted by Mr. E. N. Richards (*vide infra*), Assistant to the Deputy Island Chemist.

During the past year one Assistant, Mr. E. K. P. Blake, left the Department in order to take up a position in South America. Mr. Cole was promoted from an Apprentice to be Technical Assistant in place of Mr. Blake.

Three Apprentices are employed, and these receive practical instructions in various methods of Chemical Analysis.

The remainder of the staff is the same as last year.

W. LEIGH BARNETT, B.A., B.Sc., F.I.C.,
Deputy Island Chemist.

REPORT ON EXPERIMENTS IN CONNECTION WITH THE MANUFACTURE OF CONDENSED MILK IN JAMAICA.

To test the possibilities of Condensed Milk manufacture under tropical conditions a small experimental milk condensing unit was imported from the United States of America. The plant was successfully erected by Mr. G. W. W. Serrant of Kingston, and after various minor alterations and adjustments it was found possible to make a start in December, 1923. Between the 11th December, 1923, and 11th January, 1924, six experiments were conducted, two with water and four using milk made from skim milk powder, and adjusted to the composition of a normal skimmed milk.

Experiments 1-4.—The two experiments with water demonstrated that it was possible to get and maintain a satisfactory vacuum with the plant, and much useful data was obtained with regard to the relation of steam pressure in jacket and coils, water in condenser, temperature in pan and vacuum, to rate of evaporation.

In none of the first four experiments with skim milk was a satisfactory product turned out. Much experience was, however, gained in regard to the behaviour of the boiling milk, rate of evaporation, finishing, etc., and in the manipulation of the various valves, under actual working conditions.

Experiment 5.—As a result of the experience gained in the foregoing experiments a final experiment with skim milk was undertaken on the 15th January, and resulted in the first satisfactory run, a charge consisting of 70.25 lbs. skim milk and 11.25 lbs. sugar being evaporated down in 50 minutes.

The resulting condensed milk was not cooled down, and separated sugar crystals in less than a week. Samples tinned in unsterilised tins developed mould growths in 19 days.

Experiment 6.—Sufficient experience with regard to the actual working of the plant, etc., having now been secured an experiment with fresh milk was undertaken on the 17th January. A charge consisting of 62.5 lbs. of milk containing 3.9% fat, and 10 lbs. of sugar was evaporated down in about 50 minutes, cooled down to 70 degs. F. with constant stirring, and resulted in a condensed milk of the following composition:—

Water	..	25.60%
Milk Solids	..	31.56
Fat	..	9.67
Proteins	..	8.22
Lactose	..	12.20
Ash	..	1.47
Cane Sugar	..	42.84
		100.00

The product obtained was quite a normal condensed milk and was the first successful product turned out. Samples were tinned in unsterilised "solder seal" tins and examined from time to time. All the samples examined during the first two weeks were found to have kept perfectly, but samples opened during the third and subsequent weeks were all found to have developed mould growths. Check samples put up in sterilised bottles kept perfectly for over eight months. The samples along with some of those canned on the 15th January, were submitted to the Microbiologist, who isolated and identified the organisms as *Aspergillus A.*, *Aspergillus B.*, *Penicillium*, and *Actinomyces sp.*, common saprophytes in the air, and in dust, etc.

Experiment 7.—A further experiment using a charge consisting of 62.5 lbs. fresh milk containing 3.9% fat, and 10 lbs. sugar was evaporated down on the 31st January, resulting in a satisfactory product which was canned in sterilised and unsterilised tins. Samples tinned in unsterilised tins were found to keep satisfactorily for three weeks, after which time mould growths of the same type found in samples of the 15th and 17th January developed. Samples of the same batch canned in sterilised tins were found to keep satisfactorily in every respect over a period of 6 months.

Experiment 8.—As any commercial enterprise if established would necessitate the carriage of fresh milk over fairly long distances by road and rail, an experiment was conducted to test the effect of possible churning on fresh milk previously heated and then transported any distance. 64 lbs. of fresh milk containing 4.4% fat was received from the Hope Stock Farm at 6 a.m. on the 4th February. The milk was heated to 185 degrees F. with constant stirring, and placed into a special double jacketed can which had previously been steamed out. The temperature of the milk when placed in the can at 10 a.m. was 183 degrees F.; the can was sent to Kingston and from thence to Four Paths by rail, being re-shipped to Kingston from that point, finally arriving back at the Laboratory at 4 p.m., when the temperature of the milk was found to be 161 degrees F. The distance travelled by road and rail was approximately 84 miles. The milk was found to have travelled this distance without change, and to be in as sweet a condition as when sent away in the morning. A charge consisting of 64 lbs. milk and 11.25 lbs. sugar was evaporated down, and although slightly overcondensed, a satisfactory product was obtained. Here again the experience gained in previous experiments was repeated, samples canned in unsterilised tins keeping well for about 3 weeks, after which time mould growths developed, while samples tinned in sterilised tins kept for over 6 months.

Experiment 9.—This experiment was a repetition of the previous one over a longer distance and time. 63 lbs. of fresh milk containing 3.5% fat was received from the Hope Stock Farm at 6 a.m. on the 18th February. The milk was heated to 187 degrees F. with constant stirring, and placed in a special double jacketed can, the temperature being 185 degrees F. The can was sent by rail to Montego Bay where it arrived at 7.30 p.m., the temperature of the milk at that time being 150 degrees F. The milk which up to that time had travelled approximately 120 miles by road and rail was found to be unchanged and quite sweet. A sample drawn off into a clean glass vessel kept perfectly until the next morning. At 9 p.m. the milk was again heated up to 187 degrees F. and replaced in the double jacketed can. The milk after standing all night was examined at 6 a.m. on the morning of the 19th, when the temperature was found to be 153 degrees F. Apart from a slight separation of cream on the surface, the milk was then in perfect condition, and was trained back to Kingston arriving at the Laboratory at 3.45 p.m., having travelled a total distance of nearly 240 miles, 227 of which were under the special conditions (due to curves and shunting) met with on the Jamaica Government Railway. On receipt at the Laboratory the temperature of the milk was 133 degrees F.; no churning had taken place, and with the exception of a very slight cooked flavour the milk was in good condition, after having been kept at a temperature above 140 degrees F. for over 30 hours. A charge consisting of 62 lbs. milk and 10 lbs. sugar was evaporated down in 40 minutes, and the resulting condensed milk tinned in sterilised bottles and unsterilised tins. The product was slightly overcondensed and had a slight cooked flavour. Samples opened from time to time showed, as was to be expected from the experience gained in previous experiments, that the product canned in unsterilised tins kept well for about 3 weeks, after which time mould growths began to appear. Samples kept in sterilised bottles were found to be well preserved after 3 months.

Experiment 10.—Owing to the severe drought experienced during the first half of 1924, as well as allowing the time necessary for testing the keeping qualities of samples to elapse, the next Experiment was not carried out until the 9th September. On this date an experiment was made using plantation white sugar in place of refined sugar hitherto used. The fresh milk and sugar were kindly supplied by Mr. P. A. Bovell of the Caymanas Estates, Ltd. While in the four previous experiments the fresh milk as received was used, the procedure adopted in this case was first to analyse the raw milk and then separate a portion, after which a suitable proportion of the separated milk, original raw milk, and sugar, were condensed to produce a condensed milk having a fat content of slightly over eight per cent. The plantation white sugar supplied was at the time just over five months old, while the fat content of the

raw milk was 3.8%. After separation of a portion of the raw milk a charge was made up consisting of 71.5 lbs. fresh milk having a fat content of 3.5%, and 11 lbs. of sugar. This quantity was condensed in less than 45 minutes, and produced 26 lbs. of condensed milk, the degree of concentration being 2.75 : 1. An analysis of this sample gave the following data:—

<i>Water</i>	..	23.97%
<i>Milk Solids</i>	..	32.96%
<i>Fat</i>	..	8.93%
<i>Proteins</i>	..	9.32%
<i>Lactose</i>	..	13.02%
<i>Ash</i>	..	1.69%
<i>Cane Sugar</i>	..	43.07%
		100.00

The finished product was a condensed milk of good quality both in general appearance (colour, etc.) and taste; no objectionable flavour or colour was imparted by the plantation white sugar. The degree of concentration was rather high, 2.75 : 1 as against the standard of 2.5 : 1 aimed at. This is reflected in the Total Solids of the sample, 76.03% as against 73–74% aimed at. The product was tinned in 14 oz. sanitary seal tins, which were previously sterilised, and samples opened from time to time have so far been found to keep perfectly for over 4 months.

Experiment 11.—On the 19th November a further experiment, using plantation white sugar, was conducted as a demonstration before the members of the Committee on Dairy Industry. A charge consisting of 73.5 lbs. fresh milk and 11.75 lbs. sugar was condensed in about 40 minutes, the finished product which was undercondensed, having the composition:—

<i>Water</i>	..	33.30%
<i>Milk Solids</i>	..	30.59%
<i>Fat</i>	..	8.66%
<i>Proteins</i>	..	7.71%
<i>Lactose</i>	..	12.84%
<i>Ash</i>	..	1.38%
<i>Cane Sugar</i>	..	36.11%
		100.00

The condensed milk was canned in 14 oz. sanitary seal tins, and samples opened from time to time showed that the product has so far kept satisfactorily over a period of eight weeks. Samples of this batch were distributed through the S.M.O. to various Public Hospitals for trial, and although much undercondensed, reports on the sample were on the whole satisfactory, the chief complaint being, as was to be expected, the rather thin consistency of the product.

Experiment 12.—On the 31st December a charge consisting of 69.5 lbs. fresh milk standardised to contain 3.2% fat, and 11 lbs. sugar was condensed in 40 minutes, yielding a condensed milk which gave the following data on analysis:—

<i>Water</i>	..	20.79%
<i>Milk Solids</i>	..	35.34
<i>Fat</i>	..	9.93
<i>Proteins</i>	..	9.19
<i>Lactose</i>	..	14.63
<i>Ash</i>	..	1.59
<i>Cane Sugar</i>	..	43.87
		100.00

This batch which was slightly overcondensed, was canned in sanitary seal tins and distributed for consumption at the Hope Stock Farm.

General Remarks.—The average composition of sweetened condensed milk is as follows:—

<i>Water</i>	..	26.50%
<i>Milk Solids</i>	..	32.60
<i>Fat</i>	..	9.00
<i>Proteins</i>	..	8.50
<i>Lactose</i>	..	13.30
<i>Ash</i>	..	1.80
<i>Cane Sugar</i>	..	40.90
		100.00

A comparison of the analytical data obtained for the samples of condensed milk made in Experiments 6, 10, 11 and 12, with the above figures is instructive.

	Standard.	Exp. 6.	Exp. 10.	Exp. 11.	Exp. 12.	
<i>Water</i>	26.50	25.60	23.97	33.30	20.79	per cent.
<i>Milk Solids</i>	32.60	31.56	32.96	30.59	35.34	
<i>Fat</i>	9.00	9.67	8.93	8.66	9.93	
<i>Proteins</i>	8.50	8.22	9.32	7.71	9.19	
<i>Lactose</i>	13.30	12.20	13.02	12.84	14.63	
<i>Ash</i>	1.80	1.47	1.69	1.38	1.59	
<i>Cane Sugar</i>	40.90	42.84	43.07	36.11	43.87	
	100.00	100.00	100.00	100.00	100.00	

While all the samples are within the extreme limits for sweetened condensed milk, the general appearance and subsequent behaviour of the samples depended on many and fluctuating conditions, such as the amount of heat applied towards the end of the process, the temperature of the sample when drawn from the vacuum pan, the percentage of fat and sugar in the condensed product, and cooling of the finished condensed milk. Working with normal fresh milk to which sugar has been added in the proportion of 16% by weight, it can, however, be safely stated that all factors being equal, any deviation from a standard of 73.50 per cent. Total Solids by more than 3.5 per cent. either way will produce a condensed milk open to criticism from a public who are accustomed to a standardised article.

Mechanical devices and methods for testing when the condensed milk is of the right degree of concentration could be depended upon were all the conditions influencing the final density of the liquid under control, and time of no account. With boiling and rapidly evaporating milk in the vacuum pan quick action is, however, essential, one minute making all the difference whether the resulting product is too thick or too thin. There is not time to carefully measure and weigh out a sample of the milk, nor can the processor always wait until the hydrometer has found its equilibrium in as viscous a fluid as sweetened condensed milk. For these reasons arbitrary mechanical instruments and methods have not been found uniformly satisfactory. While they are desirable to use as a check, the experienced eye and good judgment of the processor are all essential. Working with small and fixed quantities of material and without previous experience, it will, I think, be admitted that the results obtained in the experiments have been on the whole satisfactory.

Manufacturing Data.—To produce a condensed milk of normal composition containing 73.5 per cent. Total Solids, and having a concentration of 2.5 : 1 i.e., 2.5 parts of fresh milk condensed to 1 part of condensed milk, it has been calculated and proved by actual experience from the data provided by the various experiments that each 14 ounce tin of condensed milk would require 5.38 ozs. of sugar and 0.841 quarts of fresh milk of average quality. As the price of both milk and sugar are subject to fluctuations, it is obvious that any estimate of the commercial possibilities of condensed milk manufacture in Jamaica will depend primarily on the price of these two commodities. As, however, most fresh milks in the tropics range higher in fat content than in temperate climates, it would be safe to allow for a small margin of profit in the way of butter as a by-product from the cream remaining after standardising the fresh milk should it be thought desirable to produce an absolutely standard condensed milk as regards fat content.

While the number of experiments it has been possible to undertake so far have been necessarily limited, yet sufficient data has been obtained to warrant the opinion that the successful manufacture of condensed milk in Jamaica is practicable.

Experimental data obtained so far, shows:

1. It is possible to replace imported refined sugar by a good quality plantation white sugar, thereby considerably reducing the cost of production.

2. Milk previously heated to 187 degrees F. if placed in special double jacketed containers will travel long distances by road and rail, keep sweet for over 24 hours, and can be subsequently condensed to produce a satisfactory condensed milk, thus enabling any prospective factory to draw milk from almost any part of the Island.

3. To ensure condensed milk keeping it is necessary to work under the most sanitary conditions at all stages, while the finished product must be canned in tins which have been previously sterilised.

The successful manufacture of condensed milk calls for a thorough knowledge of the Science and Practice of Evaporating in Vacuo on the part of those engaged in the operation, as well as a great amount of skill and experience in the general manipulation of the process through which the fresh milk and sugar must pass before a satisfactory condensed milk is produced. Most has now been learnt, and with the experience gained so far, it is to be hoped that an opportunity will be afforded during the present year to put the small experimental plant now in possession of the Government to practical use on an extended scale so as to more fully test out various working details and actual costs on a small commercial basis.

The thanks of the Department are due to Messrs. Levien and Sherlock of Kingston, who entirely free of cost very kindly supplied the 14 ounce sanitary seal tins used for canning the condensed milk made in the various experiments, and also for placing their canning machinery at our disposal and giving us every facility and help from time to time.

E. N. RICHARDS,
Asst. to D.I.C.

IX.—THE WEST INDIAN AGRICULTURAL CONFERENCE.

An Agricultural Conference was held here from January 28th to February 2nd under the Presidency of Sir Francis Watts, K.C.M.G., D.Sc., F.I.C., F.C.S., Principal of the Imperial College of Tropical Agriculture and Imperial Commissioner of Agriculture for the West Indies.

The Conference was opened by His Excellency the Governor, Sir Leslie Probyn, K.C.M.G.

The following delegates were present:—Sir A. E. Shipley, G.B.E., LL.D., Sc.D., F.R.S. (Chairman of the Imperial College of Tropical Agriculture); Professor H. A. Ballou, M.Sc., (Professor of Zoology and Entomology, Imperial College of Tropical Agriculture); Professor S. F. Ashby, B.Sc., (Professor of Mycology and Bacteriology, Imperial College of Tropical Agriculture); Dr. S. C. Harland, D.Sc., F.L.S., F.E.S., (Professor of Botany, Imperial College of Tropical Agriculture); W. Nowell, Esq., D.I.C. (Assistant Director of Agriculture and Mycologist, Trinidad); W. S. E. Barnado, Esq., M.A., (Chairman, Trinidad Agricultural Society); Brevet Colonel the Hon. H. Bryan, C.M.G., D.S.O., (Colonial Secretary, Jamaica); H. H. Cousins, Esq., M.A., (Director of Agriculture and Island Chemist, Jamaica); C. C. Gowdey, Esq., B.Sc., F.E.S., F.Z.S., (Government Entomologist, Jamaica); C. G. Hansford, Esq., M.A., (Government Microbiologist, Jamaica); Dr. S. Lockett, V.M.D., (Government Veterinary Surgeon, Jamaica); P. W. Murray, Esq., (Superintendent of Agriculture, Jamaica); S. S. Stedman, Esq., (Advisory Committee on Banana Industry, Jamaica); Hon. A. G. Nash, B.Sc., F.R.S.E., F.R.G.S., A.M.I.C.E., (Board of Management, Lititz Fibre Plantation, Jamaica); E. W. Muirhead, Esq., (Board of Management, Grove Place Stock Farm, Jamaica); J. F. Brennan, Esq., A.M.I.C.E. (Government Meteorologist, Jamaica); A. H. Spooner, Esq., (Board of Management, Jamaica Agricultural Society); J. Barclay, Esq., (Secretary, Jamaica Agricultural Society); R. S. Gamble, Esq., and Hon. H. V. Myers, M.B.E., (Chamber of Commerce, Jamaica); Hon. A. E. Harrison, B.A., and P. C. Cork, Esq., C.M.G., (Jamaica Imperial Association); R. A. Alston, Esq., A.R.C.S., B.Sc. (Assistant Government Botanist and Mycologist, British Guiana); J. R. Bovell, Esq., I.S.O., F.L.S., F.C.S. (Director of Agriculture, Barbados); Hon. R. Nosworthy (Collector General of Jamaica, representing the Leeward Islands); E. Stanley Woods, Esq., (British Honduras); G. A. Albury, Esq. (Chairman, Board of Agriculture, Bahamas); L. Ogilvie, Esq., M.A., B.Sc., (Plant Pathologist, Bermuda); Capt. A. W. Hill, F.R.S., M.A., Sc.D., F.L.S. (Director, Royal Botanic Gardens, Kew); S. P. Wiltshire, Esq., M.A., (Imperial Bureau of Mycology); Dr. S. A. Neave, Sc.D., (Assistant Director Imperial Bureau of Entomology); E. A. DePass, Esq., and A. E. Aspinall, Esq. (representing the West Indian Committee); R. G. W. Farnell, Esq., B.A., A.R.C.S., A.I.C. (British Empire Sugar Research Association).

The proceedings of the Conference are being published in full and are at present in the press. The delay in the publication of the proceedings is due to the difficulty in getting the reports from the reporters, as well as to the difficulty in obtaining copies of some of the papers from some of the delegates.

C. C. GOWDEY } Joint Secretaries.
C. G. HANSFORD }

XI.—AGRICULTURAL LEGISLATION IN 1924.

(A) LAWS RELATING TO AGRICULTURE PASSED DURING THE YEAR, 1924.

Law No.	Date Assented to.	Short Title.	Chief Provisions.
8	May 20th	Lititz Agricultural Loans Law, 1924	Authorising the Board of Management of the Lititz Fibre Factory to make Loans, under the Agricultural Loans Law, out of funds authorised by Legislative Council and providing for the pledging of Fibre Crops in connection with such loans for a period not exceeding five years.
13	June 4	Animals Contagious Diseases Law, 1924	Amending Law 24 of 1890 so as to authorise the Governor to make Orders restricting and regulating the landing of animals, fodder, etc., brought from a foreign country.

(B) ORDERS, RULES, ETC., RELATING TO AGRICULTURE, PUBLISHED DURING THE YEAR, 1924.

Date.	Description.	Subject.
1923. Dec. 27th	Order under Law 29 of 1922	Appointing a Chief Commissioner, three Commissioners for the whole Island and thirteen Commissioners for separate parishes.
Dec. 10th	Do.	Ordering the slaughter of any cattle, sheep, goat or swine which the Chief Commissioner may consider to be likely to spread Foot and Mouth Disease in an Infected Place or Suspected Area; also prescribing payment of compensation for animals so slaughtered.
1924. Jan. 9th	Govt. Notice No. 20	Re-appointment of Local Foot and Mouth Disease Advisory Boards for parishes of St. Mary, St. Ann, Trelawny, St. James, Westmoreland, St. Elizabeth and Manchester.
" 16th	Proclamation under Law 8 of 1873	Appointing a Commissioner to enquire into the origin of the outbreak of Foot and Mouth Disease in Jamaica in 1922.
" 16th	Govt. Notice No. 36	Appointing Local Foot and Mouth Disease Advisory Board for parish of St. Catherine.
" 21st	Govt. Notice No. 38	Appointment of Local Foot and Mouth Disease Advisory Board for parish of Portland.
" 22	Order under Law 29 of 1922	Extending the area of land in the parishes of St. Andrew and St. Thomas declared to be infected with Swine Fever.
" 25th	Order under Law 3 of 1915	Prohibiting the planting of "Gros Michel" banana within the limits of the Town of Port Antonio.
" 29th	Govt. Notice No. 61	Appointment of Local Foot and Mouth Disease Advisory Board for parish of Clarendon.
Feb. 5th	Order under Law 29 of 1922	Declaring entire parishes of Westmoreland and Hanover and portions of parishes of St. James and St. Elizabeth a "Suspected Area" for Foot and Mouth Disease.
"	Rules under Law 29 of 1922	Revoking old and prescribing new Rules for regulating and dealing with Foot and Mouth Disease.
" 13th	Proclamation under Law 23 of 1916	Prohibiting the importation of citrus fruits from any country whatsoever.
" 18th	Order under Law 29 of 1922	Appointing the Inspector of Police at Black River to be a Commissioner under Law 29 of 1922 for parish of St. Elizabeth.
" 19th	Govt. Notice No. 106	Appointment of Local Foot and Mouth Disease Advisory Board for parish of St. Andrew.
" 26th	Govt. Notice No. 123	Appointment of Local Foot and Mouth Disease Advisory Board for parish of Hanover.
March 3rd	Govt. Notice No. 133	Appointment of Local Foot and Mouth Disease Advisory Board for parish of St. Thomas.
"	Govt. Notice No. 137	Appointment of V. C. Logan, Esq., to be a member of Local Foot and Mouth Disease Advisory Board for Manchester, vice the late Mr. A. C. L. Martin.
" 17th	Order under Law 24 of 1890	Prohibiting the importation of cattle or animals, carcasses of cattle or animals, fodder, litter or dung from the State of California, U.S.A.

Date.	Description.	Subject.
1924.		
March 24th	Order under Law 24 of 1890	Prohibiting the importation of cattle, animals, carcasses, fodder, litter or dung from Great Britain and Ireland; also prohibiting the importation of dogs from these countries.
April 25th	Order under Law 29 of 1922	Altering the area in the parish of St. Elizabeth declared to be a "Suspected Area" for Foot and Mouth Disease.
" 30th	Govt. Notice No. 278	Removing Domestic Poultry, Rabbits, Guinea Pigs, Cats and Monkeys from list of animals which may be imported from the United Kingdom without special Permit from Governor.
May 13th	Govt. Notice No. 320	Adding Spanish Honduras, Guatemala and the State of California to the places from which Domestic Poultry, Rabbits, Guinea Pigs, Cats and Monkeys may not be imported without special permit from Governor.
" 17th	Proclamation under Law 17 of 1902	Prohibiting the setting of fire to land within the parish of St. James.
" 17th	Do do	Prohibiting the setting of fire to land within the parish of Westmoreland.
" 27th	Govt. Notice No. 361	Expunging the name "Chicken Hawk or Red Tailed Buzzard" from the list of Protected Birds, under Law 33 of 1914.
June 11th	Proclamation under Law 17 of 1902	Prohibiting the setting of fire to land within the parish of St. Catherine.
" 11th	Govt. Notice No. 415	Appointment of Chairmen of Local Foot and Mouth Disease Advisory Boards for parishes of St. Thomas, St. Mary, St. Ann, Trelawny, St. Elizabeth, Manchester, Clarendon and St. Catherine.
" 17th	Order under Law 29 of 1922	Removing the quarantine which had been imposed on certain areas in Kingston, St. Andrew and St. Thomas on account of Swine Fever.
July 1st	Govt. Notice No. 464	Appointment of Hon. A. G. Nash to be a member of Sugar Industry Aid Board vice Hon. G. S. Ewen.
July 2nd	Govt. Notice No. 474	Appointment of Messrs. S. Lockett and H. Campbell Maxwell under the Tick (Control and Eradication) Law 1920.
" 7	Govt. Notice No. 490	Appointment of Chairman of Local Foot and Mouth Disease Advisory Board for St. Andrew.
" 12	Proclamation under Law 20 of 1924	Bringing into operation Law 20 of 1924 (A Law for Continuing Temporary Aid for the Preservation of the Sugar Industry).
" 24	Govt. Notice No. 524	Appointment of Chairman of Local Foot and Mouth Disease Advisory Board for Trelawny.
Aug. 5	Rules under Law 29 of 1922	Rules for regulating and dealing with Anthrax.
" 6	Govt. Notice No. 562	Instructions regarding Jamaica Government Sugar Test.
" 27	Govt. Notice No. 625	Appointment of Chairmen of Local Foot and Mouth Disease Advisory Boards for parishes of St. Andrew, Portland, St. James, Hanover and Westmoreland.
Sept. 2	Order under Law 29 of 1922	Withdrawing quarantine imposed on western parishes in respect of Foot and Mouth Disease.

<u>Date.</u>	<u>Description.</u>	<u>Subject.</u>
1924.		
Sept. 2	Order under Law 29 of 1922	Withdrawing prohibition against holding of Race Meetings in "Infected Areas."
Oct. 7	Order under Law 24 of 1890	Prohibiting the landing of cattle, animals, carcasses of animals, fodder, litter, dung, etc., imported from any part of the United States.
" 28	Govt. Notice No. 771	Adding the United States of America to the list of places from which Domestic Poultry, Rabbits, Guinea Pigs, Cats and Monkeys may not be imported without special permit from the Governor.
Dec. 12	Order under Law 24 of 1890 and Law 13 of 1924	(a) Prohibiting the importation of cattle, other ruminants and swine from the United Kingdom and (b) specifying regulations under which horses, other solipeds and dogs may be imported from the same country.

XII.—STAFF.

Changes.—The Head Office Staff was strengthened by the addition of an Accountant, Mr. H. Clark holding the appointment until the end of November when he was succeeded by Mr. N. B. Donaldson

Mr. M. S. Goodman, who had acted since 1920 as Superintendent of Public Gardens, was confirmed in the appointment. Mr. E. Downes, formerly Assistant Superintendent of Public Gardens, was appointed to the new office of Horticulturist.

The following appointments were also made: Mr. S. C. Gordon, Temporary Clerk; Mr. W. H. Redpath, Local Inspector of Plant Diseases; Mr. H. B. Cole, Technical Assistant.

During the year the following officers severed their connection with the Department:

Mrs. M. Burrell, Temporary Clerk; Messrs. H. M. King, J. E. Carpenter and R. G. Kirkham, Inspectors of Plant Diseases; Mr. E. K. P. Blake, Technical Assistant and Mr. F. A. L. Dick, Assistant to Microbiologist.

Leave.—Mr. E. Downes was absent from the Island for four months (approximately) and Mr. C. G. Hansford, Microbiologist, for three months. Mr. J. E. Carpenter, Inspector of Plant Diseases received 3 months vacation leave.

I desire to record my appreciation of the zealous and loyal manner in which the staff have co-operated during the past year to carry on the many lines of work in which we seek to serve the public of Jamaica.

I have the honour to be,

Sir,

Your obedient servant,

H. H. COUSINS,
Director of Agriculture.

